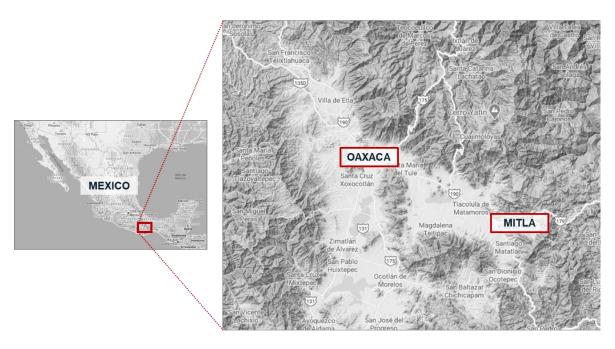
PROJECT LIYOBAA

MITLA GEOPHYSICAL INVESTIGATION

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1. Introduction



The ancient Zapotec city of Mitla is one of the most important archaeological sites in the Mexican state of Oaxaca. The ruins of Mitla have been known to travelers ever since the $18^{\rm th}$

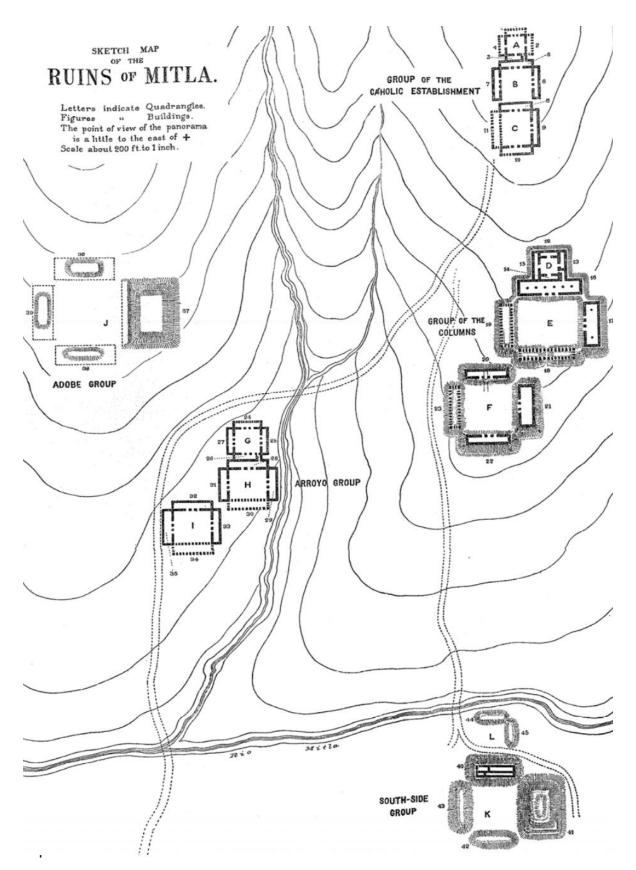
Century. They were visited, amongst others, by Dupaix, Humboldt and Charnay.

Mitla is principally known for its beautiful stone mosaics and the ornate architecture of its pre-Columbian buildings, many of which are among the best preserved in Mesoamerica.

The ruins presently consist of five main groups called the Church Group, the Group of the Columns, the Adobe Group, the Arroyo Group and the South Group. Of these, the Group of the Columns is by far the most imposing and the best preserved. All these groups share a similar layout, consisting of a generally square or rectangular courtyard surrounded by raised platforms and buildings on all four sides. The buildings were of stone, lined with beautifully cut and polished rectangular stone blocks. The span of the doorways was bridged by huge monolithic lintels; some measuring over 6 meters (19 ft) long and weighing over 30 tons. The roof of the larger halls was supported by monolithic columns, of which several still stand. The columns are without capital and measure between 4 and 5 meters (13 to 16 ft) high, with an estimated weight of 15 tons. Several possible quarries have been identified for the stones, a hard type of basaltic andesite, located at distances of between 3 and 10 kilometers from the main site.

The walls were lined, both internally and externally, with beautiful mosaic panels, formed of thousands of small stone pieces artfully arranged in a variety of geometric motifs and grecques, perhaps in the imitation of textiles.

Underneath the southern building of the Columns Group two subterranean cruciform chambers have been excavated. These are remarkable for the exceptional quality of the megalithic stonework and stone mosaics that decorate the walls, and for being partially carved out of the natural bedrock. The joints are so tight that not a sheet of paper would fit between two stones. The quality of the workmanship is also evident in the execution of the mosaic panels. Unless the ones above ground, which consist of thousands of minuscule stone tails, the panels below ground are entirely monolithic, each carved from a single block of stone in intricate geometrical patterns.



An early plan of the ruins of Mitla. After Holmes, 1895.

Similar ruins also exist in the vicinities of Mitla, at Xaagá and Guirún. One of the cruciform chambers of Guirún measures 10 by 8.7 meters across (32.8 by 28.6 ft). It is entirely built of megalithic stone blocks, the largest measuring 3.8 meters (12.5 ft) long, and remains unroofed².

Near the village of Unión Zapata, 2 kilometers to the East of Mitla, is found an enormous partially worked stone block still lying in the quarry. Its measurements are 12 meters long by 4 meters wide and 2.5 meters thick (39 ft by 13 by 8), with an estimated weight of 300 tons³. Possibly hundreds more stone blocks still lie in the quarries around Mitla, in different stages of completion⁴.

The number and size of the blocks still lying in the quarries testify to a colossal building program that remained unfinished. This can only be explained by the exceptional importance of Mitla as a sacred center and a place of worship throughout ancient and modern times.

When the first Spanish expedition arrived in Oaxaca in 1521, they found Mitla already in ruins, possibly as a consequence of an earlier Aztec incursion in 1494. It is not clear if it was the Aztec conquest that caused the abandonment of all monumental construction at the site, or if this had already occurred at an earlier date. A recent 2019 study has found evidence of a massive landslide that might have contributed to the decline and eventual collapse of Zapotec civilization in the late Classic/ Early Post-classic period. The same study found evidence of what may be buried pyramids and structures under the avalanche deposits⁵.

¹ See: Gary M. Feinman and Lind M. Nicholas, Hilltop Terrace Sites of Oaxaca: Intensive Surface Survey at Guirún, El Palmillo and the Mitla Fortress, Chicago: Field Museum of Natural History, 2004.

² See: Marshall H. Saville, *The Cruciform Structures of Mitla and Vicinity*, Putnam, 1909.

³ Nelly M. Robles Garcia, *Las Canteras de Mitla*, Vanderbilt University, 1994, pp. 17-19.

⁴ Ibid.

⁵ V. H. Garduño-Monroy, et al., The Mitla Landslide: An event that changed the fate of a Mixteco/ Zapoteco Civilization in Mesoamerica, International Journal of Geophysics, vol. 2019, https://doi.org/10.1155/2019/5438381.

The ruins of Mitla represent a unique example of megalithic architecture, displaying a workmanship and a tendency towards monumentality unknown in the rest of Mesoamerica. These magnificent structures appear as if out of nowhere, and are the expression of a tradition of working in stone that had already become extinct long before the time of the Spanish conquest.

2. Historical accounts

Most early historical accounts of Mitla have focused on the city's ritual association with the Underworld or *Mictlan*, and the rituals and ceremonies that were performed at Mitla in honor of the deceased. These traditions have been largely ignored in the more recent literature on the site, which has rather focused on the surviving monumental structures and archaeological remains.

Friar Bernardino de Sahagún's Historia General de las Cosas de la Nueva España (1558)

While Sahagún does not provide a direct description of the ruins of Mitla, he mentions the tradition according to which

"Quetzalcoatl built some dark houses underground, at a place called Mictlancalco"6.

Friar Juan de Torquemada's Monarquía Indiana (1613)

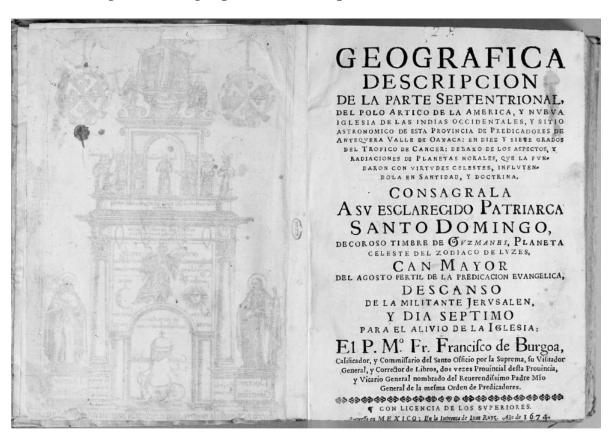
Of the ancient ruins of Mitla, Friar Torquemada (1557-1624) wrote:

"When some monks of my order, the Franciscan, passed, preaching and shriving, through the province of Zapoteca, whose capital city is Tehuantepec, they came to a village which was called Mictlan, that is, Underworld [Hell]. Besides mentioning the large number of people in the village they told of buildings which were prouder and more magnificent than any which they had hitherto seen in New Spain. Among them was a temple of the evil spirit and living-rooms for his demoniacal servants, and among other fine things there was a hall with ornamented

 $^{^6}$ Bernardino de Sahagún, Historia General de las cosas de la Nueva España, 1558, vol. III, p. 294.

panels, which were constructed of stone in a variety of arabesques and other very remarkable designs. There were doorways there, each one of which was built of but three stones, two upright at the sides and one across them, in such a manner that, although these doorways were very high and broad, the stones sufficed for their entire construction. They were so thick and broad that we were assured there were few like them. There was another hall in these buildings, or rectangular temples, which was erected entirely on round stone pillars, very high and very thick, so thick that two grown men could scarcely encircle them with their arms, nor could one of them reach the finger-tips of the other. These pillars were all in one piece, and, it was said, the whole shaft of a pillar measured 5 ells from top to bottom, and they were very much like those of the Church of Santa Maria Maggiore in Rome, very skillfully made and polished. ""

Father Burgoa's Geographica Descripción (1674)



⁷ As quoted in Lewis Spence, Myths of Mexico and Peru, 1913, p. 199.

Francisco de Burgoa (1600-1681) provides one of the earliest and most comprehensive descriptions of Mitla in the late $17^{\rm th}$ Century. He says:

"The Palace of the living and the dead was built for the use of this person [The High Priest of the Zapotecs]...They built this magnificent house or pantheon in the shape of a rectangle, with portions rising above the earth and portions built down into the earth, the latter in the hole or cavity which was found below the surface of the earth"⁸.

After describing the main palace of Mitla (quite possibly the main building in the Columns Group), Burgoa describes the roofing of the buildings, which consisted of large stone slabs, wondering at the remarkable accuracy of the construction and the fineness of the joints:

"And what has always seemed inexplicable to the greatest architects is the adjustment of these stones without a single handful of mortar, and the fact that without tools, with nothing but hard stones and sand, they could achieve such solid work that, though the whole structure is very old and no one knows who made it, it has been preserved until the present day.9"

Continuing with his description, Burgoa adds more interesting details of the architecture of the palaces and their subterranean chambers:

"I carefully examined these monuments some thirty years ago in the chambers above ground, which are constructed of the same size and in the same way as those below ground... There were four chambers above ground and four below. The latter were arranged according to their purpose in such a way that one front chamber served as chapel and sanctuary for the idols, which were placed on a great stone which served as an altar... The second (underground) chamber was the burial-place of these high-priests, the third that of the kings of Theozapotlan, whom they brought hither richly dressed in their

⁸ Ibid., pp. 199-200.

⁹ Ibid, p. 201.

best attire, feathers, jewels, golden necklaces, and precious stones, placing a shield in the left hand and a javelin in the right, just as they used them in war... The last (underground) chamber had a second door at the rear, which led to a dark and gruesome room. This was closed with a stone slab, which occupied the whole entrance. Through this door they threw the bodies of the victims and of the great lords and chieftains who had fallen in battle. 10"

From Burgoa's description of the High Priest descending into these chambers "with a great retinue" and the ceremonies performed therein, it is clear that these rooms would have been significantly larger than the small and crammed space provided by the two excavated tombs under the south building of the Columns Group. The entrance to the underground chambers was apparently sealed shortly after Burgoa's visit:

"When later there fell upon these people the light of the Gospel, its servants took much trouble to instruct them, and to find out whether this error, common to all these nations, still prevailed; and they learned from the stories which had been handed down that all were convinced that this damp cavern extended more than thirty leagues underground, and that its roof was supported by pillars. And there were people, zealous prelates anxious for knowledge, who, in order to convince these ignorant people of their error, went into this cave accompanied by a large number of people bearing lighted torches and firebrands, and descended several large steps. And they soon came upon many great buttresses which formed a kind of street. They had prudently brought a quantity of rope with them to use as quiding-lines, that they might not lose themselves in this confusing labyrinth. And the putrefaction and the bad odour and the dampness of the earth were very great, and there was also a cold wind which blew out their torches. And after they had gone a short distance, fearing to be overpowered by the stench, or to step on poisonous reptiles, of which some had been seen, they resolved to go out again, and to completely wall up this back door of hell. The four buildings above ground were the only ones which still remained open, and they had a

¹⁰ Ibid., pp. 201-203.

court and chambers like those underground; and the ruins of these have lasted even to the present day"11.

From this description we must assume that the last underground chamber communicated with some vast natural cavern extending perhaps in a northerly direction towards a nearby range of hills. If not entirely a narrative artifice, mention of the cold wind blowing the torches of the explorers may suggest the existence of more entrances to this underground labyrinth.

Burgoa, moreover, does not provide any specific indications as to which building or palace contained the underground chambers, although from the description of the chambers above only two palaces appear to be likely candidates, namely the "Church Group" and the "Columns Group".

The modern explorers (1834-1960)

The first modern description of Mitla comes from the work of Captain Dupaix (1834). Dupaix drew the main palaces of Mitla and provided the first detailed plans of the ruins. In his time it seems that only one of the two tombs in the southern building of the Columns Group had been discovered and could be entered.

Dupaix was followed in 1860 by another Frenchman, Desiré Charnay, who also took the first photographic documentation of the ruins of Mitla. After describing the use and occupation of the ancient palaces by the natives as dwelling places, Charnay writes:

"Subterraneous passages, which were opened some years ago, extend under these ruins; but the hostile attitude of the Indians caused them to be closed up again before they could be properly explored"12.

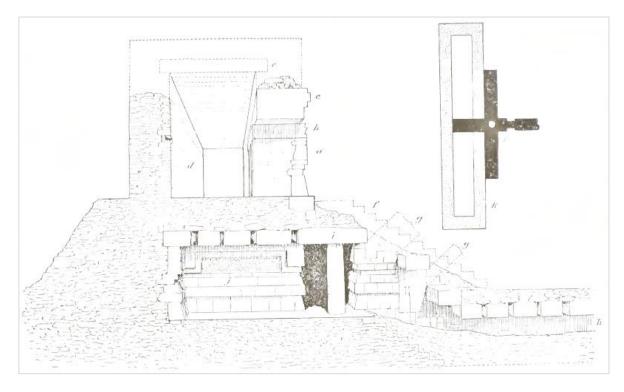
Adolph Bandelier visited Mitla and conducted the first excavations in 1881, followed by W. H. Holmes in 1895.

In his 1882 book on the Native Races of the Pacific States, Hubert H. Bancroft spoke of the subterraneans of Mitla,

¹¹ Ibid., pp. 204-205.

¹² Desiré Charnay, The Ancient Cities of the New World, New York: Harper & Brothers, 1887, p. 507.

assuming that the original cult places of the Zapotec must have been natural caverns.



Cross-section of one of the subterraneans of Mitla. After Holmes, 1895.

Also in 1882, another American, Louis Henry Aymé, then the American consul in Merida, conducted some small excavations at Mitla decided to verify the local traditions that spoke of vast underground passages and chambers under the ruins. He wrote:

"The Guardian of Mitla, Don Feliz Quero, assured me that the passage run from one side of the patio to the other, about 150 feet. Resolved to set the vexed question at rest, I had four excavations made, one 75 ft. from façade of building No.1; at a depth of 3 feet massive rock was struck. I had it carried down 3 ft. further and the rock continuing I abandoned it. A second excavation 60 ft. from building No. 1 gave precisely the same result; a third 50 ft. from building No. 1 struck rock at 3 ft. 8 in, carried down through rock to depth of 7 ft. 6 in. and abandoned; a fourth, 43 ft. from Building No.1 and 18 ft. from pillar of subterranean apartment went down 5 ft. in sand. I then set all my men to work cleaning out the passage, and finally succeeded in opening it completely. It is only a

room, and a very small one at that. Its rough dimensions are: Length 9 ft. 6 in.; height, 4 ft.; width 3 ft 7 in. Roof of very large stones. South end once closed by a very large stone still lying in the large patio...I broke through the floor to find solid rock underneath. In fact, a great hole was dug in the rock and this chamber constructed therein"¹³.

Marshall H. Saville also conducted excavations at Mitla in 1900, and explored the cruciform chamber of $Guirún^{14}$.

Then in 1901 the Mexican archaeologist Leopoldo Batres cleared much of the structures in the Columns Group and was responsible for their restoration and consolidation.

The most recent discovery of a subterranean chamber at Mitla occurred in 1960 by the archaeologist Ignacio Bernal 15 . The tomb was located in the South Group and consisted of a small and much destroyed cruciform chamber.

3. State of the research

To date, no evidence of the vast subterraneans and caverns described by Burgoa and in other early accounts of Mitla has been found.

Even so, the tradition of a secret entrance to the underworld concealed underneath one of the palaces of Mitla is still very much alive, as shown by the research conducted in 2008 by William R. Arfman on the continuity of religious practices associated with the cult of the dead at Mitla¹⁶. Arfman relates a fascinating story according to which in November of 1959 a young man who spoke Zapotec, Spanish and English died a mere few hours after Mr. Frissell, the founder of the local museum and of importance and wealth, who only spoke English. Even though the young man died of natural causes, voice had it that he had been taken into the underworld

 $^{^{\}rm 13}$ Louise H. Aymé, "Notes on Mitla", Journal of the American Antiquarian Society, April 1882.

¹⁴ Marshall H. Saville, "Cruciform Structures near Mitla", Bulletin of the American Museum of Natural History, vol. XIII, 1900, pp. 201-218.

 $^{^{15}}$ Ignacio Bernal, "Otra tumba cruciforme en Mitla", Estudios de Cultura Náhuatl, Vol. IV, pp. 223-238.

¹⁶ William R. Arfman, *Visiting the Calvario at Mitla, Oaxaca*, Sidestone Press, 2008.

as an interpreter to the subterranean Zapotec "House of the Dead"¹⁷. The source of the story, Howard Leigh, then a research consultant at the Frissell Museum of Zapotec Art at Mitla, stated:

"I believe that for all the Zapotecs the House of the Dead is the great subterranean labyrinth at Mitla, described by Burgoa, which archaeologists have been unable to find. The Mitla people claim that its entrance is hidden by the high altar of the Catholic Church" 18.

An account confirmed by multiple sources is that the entrance to an ancient subterranean was briefly uncovered in the early 2000's as the floor of the Church was being renovated, in what would be the south portion of the Church Group. Personnel sent by the Mexican National Institute of History and Anthropology (INAH) to investigate the discovery was however physically threatened and had to leave the site before any further exploration could be made.

Another place associated with the underground place of the souls is described by Arfman as a small shrine known as the "Cruz del Milagro", located at the boundary between Mitla and Matatlán, and less than half a mile away from an archaeological site also known as the Cross¹⁹.

Similar traditions surround the so-called "Cueva del Diablo", at the end of the valley, four kilometers to the east of Mitla. There, a curiously shaped, vaguely anthropomorphic stone called "Piedra de Mitla" or "Piedra de la Mujer Dormida" is said to conceal the true entrance to the underground realm of the souls.

In 2019, a new research by Victor Garduño Monroy, José Luis Macias, Stefano Morelli, Angel Figueroa Soto, et al., recognized the presence within and around the Mitla archaeological site of extensive landslide deposits likely originating with a dry-rock avalanche during historical time. Their research suggests that the landslide obliterated a large

¹⁷ Ibid., p. 90.

¹⁸ Ibid., after Howard Leigh, "Notes on Mitla Lore and Language", Boletín de Estudios Oaxaqueños, no. 18, 1960, p.3.

¹⁹ See: William R. Arfman, 2008, cit., p. 91.

part of the ancient city and was one of the main causes for its decline prior to the time of the Spanish arrival. Geoelectrical tomography studies further revealed the possible existence of large buried structures under the avalanche deposits, reaching in places a depth of over 20 meters (65 ft). The edge of the proximal avalanche would have reached as far as the present Church of San Pablo at Mitla. Unfortunately no elements have emerged to provide a certain date for the avalanche²⁰.

The area around Mitla is also exceptionally rich in caves that were inhabited since prehistoric times. Ten thousand-years old cocurbitaceae seeds found in one cave are considered to be the earliest known evidence of domesticated plants in the American continent, while corn cob fragments from the same cave are said to be the earliest documented evidence for the domestication of maize²¹. The caves contain many examples of rock art and paintings including a broad variety of human and animal subjects and spanning several thousands of years.

A particularly interesting cave is the already mentioned *Cueva del Diablo*, which is still used for modern-day rituals and is considered to be another access to the Mitla underworld²².

4. Research objectives

The investigation has the objective to confirm the existence of subterranean passages or chambers directly underneath or in the vicinities of the ruins of Mitla, as described by historical sources and popular tradition:

• Identify cavities, whether natural or artificial, that could have been used in rituals connected with the cult of the dead at Mitla.

²⁰ Garduño-Monroy VH, Macías JL, Morelli S, et al. "Landslide impact on the archaeological site of Mitla, Oaxaca", *Geoarchaeology*. 2020, pp. 1-15. https://doi.org/10.1002/gea.21790.

²¹ See: UNESCO, "Prehistoric caves of Yagul and Mitla in the Central Valley of Oaxaca", Online resource: https://whc.unesco.org/en/list/1352/, accessed October 14, 2020.

²² Alicia M. Barabas, Marcus Winter, María del Carmen Castillo and Nallely Moreno, "La cueva del Diablo: Creencias y rituales de ayer y de hoy entre los zapotecos de Mitla, Oaxaca", *Diario de Campo*, INAH, May 2005, 1-24.

- Confirm the tradition of the existence of extensive underground chambers and passageways underneath the Church Group and the Columns Group of Mitla, possibly containing intact priestly or royal burials corresponding to the ancient descriptions of Mictlán.
- Determine the extent of such chambers or cavities, their depth and approximate direction and orientation.
- Identify possible accesses for future exploration.

The Church Group, in the northern part of the ruins, appears to be the most likely match for Burgoa's 17th Century description of the subterranean burial place of the high priests of Mitla and the kings of Tehuantepec, representing perhaps the equivalent of a Zapotec Oracle of the Dead.

Whereas the majority of the research into the underground labyrinth of Mitla has focused on the Columns Group, the southern part of the Church Group has never been satisfactorily explored owing to the presence of the colonial Church of San Pablo, which was built directly over the ruins.

In addition to popular belief and oral tradition seemingly confirming the existence of vast "subterraneans" underneath the Church Group, the layout of the Church Group closely matches Burgoa's description of the "Palace of the Living and the Dead", where the entrance to the great subterranean and underground cavern of Liyobaa should be found:

- Unlike the other palaces of Mitla that all follow a similar plan, the Church Group consists in fact of three communicating courtyards of diminishing size, surrounded by rooms on all four sides, as evidenced by satellite and aerial photographs. The existence of a fourth courtyard either to the north or to the south cannot be excluded.
- Burgoa's 17th Century description seems to suggest a similar arrangement for the "Palace of the Living and the Dead", as consisting of four communicating chambers (or courtyards?) above ground, and four below ground. The sequence of four chambers described by Burgoa can only make sense by assuming that the chambers were arranged in a row just as we find in the Church Group,

- and not simply facing the same courtyard as we find instead in the Columns Group.
- A comparison of the plan of the Church Group with the southern building of the Columns Group shows that the position of the high altar of the Catholic Church matches exactly the location of the entrance to the eastern cruciform subterranean chamber of the South Columns Group.
- The construction of the Catholic Church directly on top of the ancient ruins suggests a continuation of the ritual use of this space during colonial times. The practice of "Christianizing" sites that had been associated with the old native religion is well attested throughout Mexico and elsewhere. In this respect, it only seems likely that the most important Church would be erected on the same site formerly occupied by the main Mitleño temple or shrine. Construction of the church began in 1590, replacing perhaps an earlier chapel, utilizing stones from the ruins.
- The attribution of the church to San Pablo is also significant, for this saint is usually associated in Christian iconography with caves and other underground places.
- An additional important aspect for the location of underground cavities is the fact that the Church Group sits directly on the natural bedrock, in an area that is known for its numerous natural caverns.

Other possible locations for the entrance to Mitla's underground labyrinth include the large adobe pyramid known as the Calvario, part of the Adobe Group, where a chapel was built in 1575, and the present day plaza and market square. It seems that the first temporary church of Mitla was built already in 1547 on the Calvario, owing to the fact that this spot was the most regularly visited by the local population, who called it the "Sun Pyramid"²³. In 1575, shortly after the present chapel on the Adobe Group was completed, construction started on a new and much larger church in the area now occupied by the main Plaza. This church, however, was never completed, and for

²³ See: William R. Arfman (2008), cit., p. 81.

unknown reasons the decision was taken to build what will become the present church of San Pablo over the ruins of the ancient palace known as the Church Group. This latter church was finished in 1590, thus seemingly justifying Burgoa's claim that the subterraneans could no longer be accessed in his time for they had been sealed by Catholic priests a few decades before.

5. Proposed expedition

The proposed expedition will employ non-invasive investigation techniques to confirm the possible presence of natural or artificial cavities underneath the ruins of Mitla and vicinities. Research will be conducted along three main lines of investigation:

- 1. Geophysical prospection of the Church and Columns Groups within the archaeological area of Mitla.
- 2. Geophysical prospection of areas outside the main areas of monuments of Mitla traditionally associated with the cult of the Dead and the Underworld, including the Adobe Group and Calvario of Mitla, the sites of Cruz del Milagro, Xaaqa and Guirún.
- 3. Mapping and documentation of natural and artificial cavities in the vicinities of Mitla, possibly connected with the Mitleño "Underworld".

A broad range of non-invasive geophysical techniques have become available in recent years for the detection and mapping of subsurface archaeological features.

Ground penetrating radars (Georadar or GPR) can be powerful tools in favorable conditions like uniform soils to detect archaeological features at depths of several meters without the need to conduct potentially damaging excavations. Individual lines of GPR data can help to create a tridimensional (tomographic) image of the subsoil.

Electronic Resistivity Tomography (ERT) is another methodology applied to the investigation of the subsoil of archaeological structures. Recently, this technique was employed for the detection of subterranean cavities underneath

the Castillo and Osario pyramids in Chichen Itzá in 2018^{24} , and at Teotihuacan in 2020^{25} .

In additional to the application of non-invasive geophysical techniques in the main area of monuments of Mitla and some nearby sites, on-the-ground field surveys and prospection will be conducted in the mountain ranges to the north and east of Mitla to identify possible secondary accesses to the same cave system believed to extend underneath the ruins.

6. Permissions required

An application for permission to conduct scientific investigation and exploratory research using non-invasive methods in the Mitla archaeological area and nearby sites will be submitted to the Mexican National Institute of History and Anthropology (*Instituto Nacional de Antropología e Historia* - INAH), in line with the requirements of that institution.

According to the Ley Federal sobre Monumentos y Zonas Arqueológicos, Artísticos e Históricos, art. 30:

"Toda clase de trabajos materiales para descubrir o explorar monumentos arqueológicos, únicamente serán realizados por el Instituto Nacional de Antropología e Historia o por instituciones científicas o de reconocida solvencia moral, previa autorización"

And, art. 31:

"En las autorizaciones a que se refiere el artículo anterior, el Instituto Nacional de Antropología e Historia señalará los términos y condiciones a que deban sujetarse los trabajos, así como las obligaciones de quienes los realicen".

²⁴ René E. Chavez, Andrés Tejero Andrade, Gerardo Cifuentes Nava, Denisse L. Argote, et al., "Karst Detection Beneath the Pyramid of El Castillo, Chichen Itza, Mexico, by Non-Invasive ERT-3D Methods", Nature Scientific Reports, 2018, 8: 15391. Published online October 18, 2018.

²⁵ Denisse L. Argote, Andrés Tejero Andrade, Martín Cárdenas Soto, Gerardo Cifuentes Nava, et al., "Designing the underworld in Teotihuacan: Cave detection beneath the moon pyramid by ERT and ANT surveys", *Journal of Archaeological Science*, volume 118, April 2020, 105141.

The permits required will be covered by the provisions specified by the INAH to conduct archaeological investigation in Mexico ("Lineamientos para la investigación arqueológica en México" - Issued by the INAH and Secretaría de Cultura on April 19, 2017), which can be consulted at the following link: https://www.normateca.inah.gob.mx/pdf/01496676512.PDF

7. Participants, funding and support

The proposed team will include participants from across a broad range of disciplines, including:

- Archaeologists. The project will be conducted under the supervision of a certified archaeologist affiliated with the Mexican National Institute of History and Anthropology (INAH) or other national or international academic institution recognized by the same. We will also enlist the collaboration of the local INAH delegation in Oaxaca, of the director of the Mitla archaeological area and the corresponding municipal authorities.
- Geophysical scientists. We seek the collaboration of trained geophysicists with experience in the use of ground-penetrating radar (Georadar or GPR) and Electronic Resistivity Tomography (ERT) for purposes or archaeological recognition.
- Geologists. The project will be supported by experts in geological sciences to help in the interpretation of the results of the geophysical surveys and the identification of areas where the presence of natural cavities seems more likely.
- Speleologists. The exploration of any natural or artificial cavities that will be identified over the course of the project will be conducted under the guidance of expert speleologists, provided the required permits/ authorization and equipment.
- Architectural historians and engineers. The project will be preceded by a detailed study of the existing archaeological structures of Mitla and vicinities to identify specific construction details that may hint to the presence of concealed or blocked passageways.

- Graphic and digital designers. Digital models of the main structures of Mitla will be developed with the help of graphic and digital designers, including 3D modeling and virtual reconstructions based on geophysical data of any subsurface features detected through the application of non-invasive geophysical techniques.
- Photographers and filmographers. All the expedition findings will be thoroughly documented through the generation of a comprehensive photographic record of the structures explored, the cavities and objects analyzed. Parts of the expedition may be filmed for a future documentary release and for documentation purposes.

The total expedition costs should not exceed the amount of \$10,000 USD, which will be covered in part by the participants and organizers, and also through crowdfunding initiatives and the participation of private sponsors.

A fundraising campaign to support the majority of the expedition and equipment cost will be launched through the Kickstarter (www.kickstarter.com/) or the Experiment.com (https://experiment.com/) crowdfunding platforms.

In addition, we will seek the participation of national and international sponsors and media networks.

8. Annexes

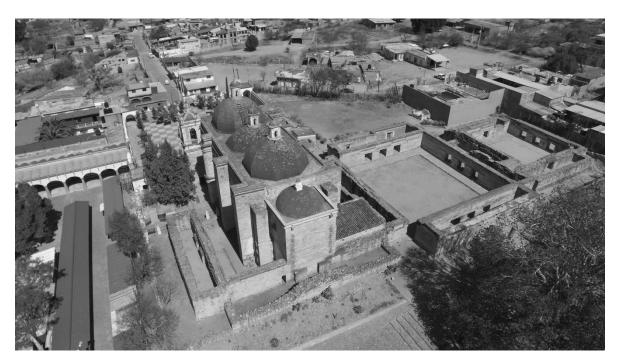


Figure 1. Aerial view of the Church Group of Mitla, with the Church of San Pablo facing west. © Marco M. Vigato.

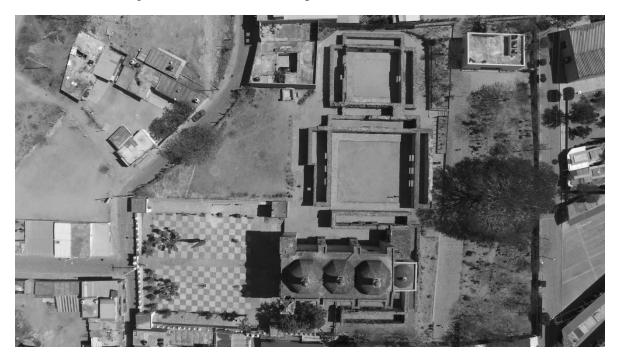


Figure 2. Zenithal view of the Church Group of Mitla, showing sequence of three surviving communicating courtyards. The Church of San Pablo occupies almost the entire space of the courtyard of the southernmost group, with the high altar located near the center of the façade of the East building of the South courtyard. © Marco M. Vigato.



Figure 3. Zenithal view of the Columns Group of Mitla, showing square courtyard and Palace of the Columns on the north side. © Marco M. Vigato.

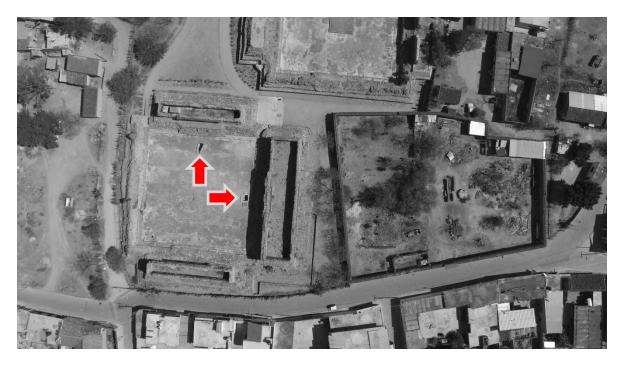


Figure 4. Zenithal view of the southern building in the Columns Group, showing entrances to subterranean chambers near the center of the façade of the north and east buildings. @ Marco M. Vigato.



Figure 5. Aerial view of the Columns and the Church group of Mitla, looking north. @ Marco M. Vigato.



Figure 5. Aerial view of the main archaeological area of Mitla with part of the Columns Group (center bottom) and the Church Group, looking North, with range of mountains in the background. © Marco M. Vigato.



Figure 6. Interior of the middle courtyard of the Church Group, looking west. Note monolithic lintels and mosaic stone panels. © Marco M. Vigato.



Figure 7. Back side of the Church of San Pablo in Mitla, incorporating monolithic lintels of Church Group palace facade. © Marco M. Vigato.



Figure 8. Entrance to excavated subterranean chamber in the southern building of the Columns Group. © Marco M. Vigato.



Figure 9. Interior of cruciform subterranean chamber in the southern building of the Columns Group. © Marco M. Vigato.

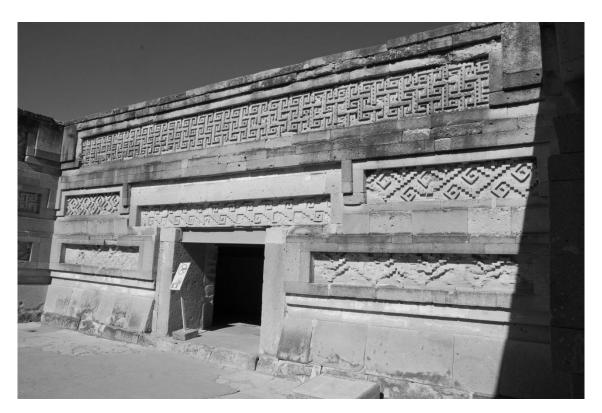


Figure 10. Façade of building in northern courtyard of the Columns Group of Mitla, with mosaic panel decoration. © Marco M. Vigato.



Figure 11. Main Façade of the Palace of the Columns in the Columns Group of Mitla, showing triple doorway and mosaic panels. @ Marco M. Vigato.



Figure 12. Entrance of subterranean chamber (bottom left) near center of the façade of southern building of the Columns Group. @ Marco M. Vigato.



Figure 13. Adobe pyramid in the Calvario Group of Mitla. Note large megalithic corner block on second level of pyramid. @ Marco M. Vigato.



Figure 14. Megalithic cruciform chamber of Guirún, showing precision mortarless construction of 12-15 tons stone blocks. © Marco M. Vigato.

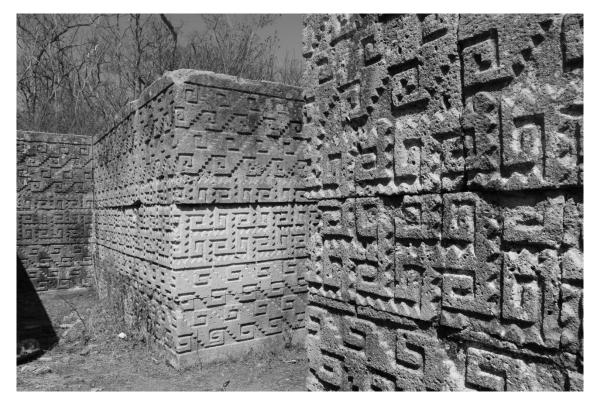


Figure 15. Sculptured decoration on the interior walls of the megalithic cruciform chamber of Guirún. © Marco M. Vigato.

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