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An Architect's underground city

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Abstract

Mimar Sinan (Sinan the Architect) is the most important architect of the Ottoman Empire with around 400 structures of historical and cultural value he had built. This extraordinary architect who lived under the reign of four Ottoman sultans and constructed buildings for three sultans was born in 1489 in a small village of Kayseri; Agirnas. It is known that Sinan was taken under the Ottoman service at the age of 22 and brought to Istanbul. He spent the rest of his life in Istanbul and died at the age of 99 in 1588. The house he was born in Agirnas was restored and turned into a museum. Below this house, there is a very impressive and complex underground city which expands to double storey. As it can be understood from hundreds of cave dwellings that exist in the nearby valleys, Agirnas Village is an old settlement and it has a gigantic underground city complex. As OBRUK Cave Research Group, our research within the scope of "Kayseri Underground Structures Inventory Project" started with the underground city below Sinan the Architect's house in Agirnas and has revealed that this underground city continues below the neighbor houses. Even though it is not possible to determine the first construction date, it is obvious that this structural complex is at least 500 years old and it shows us that the village has a gigantic underground city complex dug below the houses with a purpose of defense. This article will try to explain the architectural features of this underground city complex that covers almost this entire antique village in Agirnas, which is under the house of Sinan the Architect and connected to other houses; and the transformation of this structure from a defensive one to the daily usage during the centuries will be examined.

Key words: Sinan the Architect, Agirnas, Kayseri, Underground City.

Riassunto

Le Città Sotterranee di Sinan l'Architetto

Sinān, noto anche come Mi'mār Sinān – Mi'mār in turco significa "architetto" ed era il titolo dato all'architetto imperiale – è stato l'architetto più importante dell'Impero Ottomano. Gli vengono attribuite circa 400 realizzazioni (tra cui moschee, palazzi, bagni pubblici, caravanserragli, mausolei, ponti ed acquedotti), tutte di grande valore. Questo straordinario architetto è vissuto sotto il regno di quattro sultani ed ha costruito edifici, ricoprendo la carica di architetto capo dell'impero (Mimarbaşı), per tre di loro (Solimano il Magnifico, Selim II e Murad III).
Sinan nacque nel 1489 ad Ağırnas, un piccolo villaggio nei pressi di Kayseri nella Turchia centrale. È noto che Sinan si trasferì a Istanbul prestando servizio per gli Ottomani quando aveva solo 22 anni, trascorrendo lì il resto della sua vita fino al 1588 quando morì all'età di 99 anni. La casa natale di Ağırnas dove l'Architetto Sinan ha trascorso i primi anni della sua vita, è stata ristrutturata e trasformata in un museo. Sotto questa casa c'è una "Città Sotterranea" così estesa e complessa che si sviluppa su due livelli sotterranei. L'insediamento sotterraneo di Ağırnas è molto antico e si inserisce nel contesto delle centinaia di abitazioni ipogee che si trovano in tutta la valle circostante.
Lo studio condotto dal Gruppo di ricerca sotterranei OBRUK, sviluppato nell'ambito del "Progetto di censimento delle strutture sotterranee della provincia di Kayseri", è iniziato dagli ambienti sotterranei situati sotto la casa dell'Architetto Sinan ad Ağırnas, ed ha rivelato che queste strutture ipogee si sviluppano anche sotto le altre abitazioni circostanti.
Tale esteso complesso urbano sotterraneo che collega a scopo difensivo ogni abitazione del villaggio, sebbene non sia possibile determinarne l'originaria data di costruzione, risale certamente a oltre 500 anni fa.
Questo articolo vuole spiegare le caratteristiche architettoniche di questa città sotterranea e la sua variazione di destinazione d'uso, subita nel corso dei secoli, da struttura difensiva a struttura più appropriata per l'uso quotidiano.

Parole chiave: Architetto Sinan, Agirnas, Kayseri, Città Sotterranea.

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The Geology

The area (fig. 1) lies in Central Anatolian Volcanic Province (CAVP). It is one of the most important volcanic areas of Turkey.
It continued through the converging of the Arabian and Eurasian plates during the Middle Miocene period, 16-11.6 million years ago and developed the post clash regimes after the Upper Miocene period. This continental clash brought shortening and thickening together with the north-south compression regime that is going on today in Eastern Anatolia.
The thickness of the Eastern Anatolia Crust is about 45-50 km. At the end of the clash, the Anatolian block moved to the west through the two strike slip faults. This movement that pulled apart the basin and reverse faults, is the basic reason of the inner deformation within the Anatolian block (Alici Sen et al., 2004).
A wide scale volcanism was formed in Anatolia from the Neogene to Quaternary periods as a result of the convergence of plates and continental clash.
The mountains of Erciyes, Develi, Hasan, Melendiz, Keciboyunduran and Gollu continued their activities from 2.5 million years till 10.000 years before today.
This volcanic activity in the region piled up hundreds meters thick volcanic tuff and ignimbrite to the area around Agirnas Village.
This soft rock was dug by people in the region and fostered the development of a troglodyte civilization.

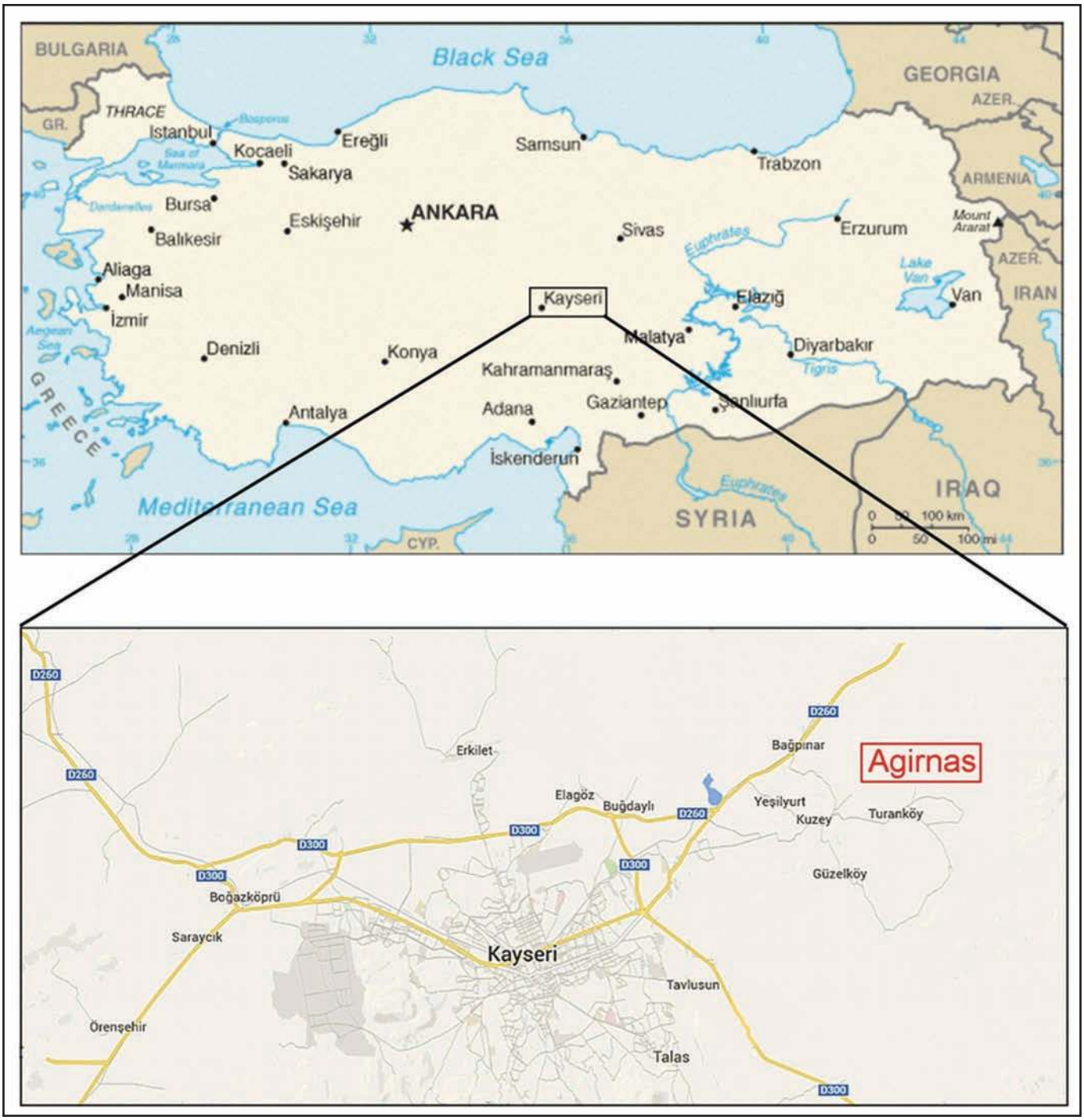


Fig. 1 - Location map showing Agirnas Village (drawing A. Yamac).
Fig. 1 - Mappa con l'ubicazione del Villaggio di Agirnas (grafica A.Yamac).

The Village

The oldest buildings in Agirnas Village that exist today are dated to 18th and 19th centuries and the establishment date of the village is not known. Agios Prokopios Church, located at the north of village and in the border of old settlements and new buildings, was built in 1857. On the other hand, there were 53 Christian and 3 Muslim families in Agirnas Village according to the population and tax records of Ottoman Empire in 1500 when Sinan the Architect used to live in the village. In 1520, these numbers have changed as 72 Christian and 2 Muslim families (Inbasi, 1993). It is almost certain that the houses of these families, just like Sinan the Architect's, were aligned to the northern front of the valley within two streets. As the years have passed, religious conversions and migrations were accelerated and, in 1834 census, 145 Muslim and 28 Christian families were determined in the village (Comert, 2008). Agirnas Village expand towards the north and northeast in parallel with the increasing population in recent years. Today, all the southern village houses, including Sinan the Architect's, were included to First Grade of Protection by the Ministry of Culture and Tourism.

Even though it is known that the oldest houses of Agirnas Village are this front row facing the valley, there are tens of cave dwellings in Akbin Valley, 700 meters west of the village (fig. 2). It is thought that some of these structures, digged in the walls of the valley which continues from Agirnas to Dimitri Village for 3 km, were built as Roman rock graves. But, it is not possible to determine the date and aim of the original dwellings due to their continuous usage for centuries by re-designing and the destruction caused by the erosions on the valley walls (Comert, 2008).

The Architect

According to his contemporary biographer and friend, Mustafa Sai Celebi, Sinan the Architect was born in 1489 at Agirnas (Akin & Crane, 2006; Necipoglu, 2010). He was born either an Armenian or a Cappadocian Greek. As the written order of Sultan Selim II, which dates to 1573 and grants Sinan's request to forgive and spare his relatives from the exile to the island of Cyprus is the most concrete resource about Sinan's family; the names of his two relatives written in this order are far away to prove an ethnic origin (Gunay, 2006; Necipoglu, 2010).

It is known that Sinan was included to the Ottoman army in 1512 as a *devshirme*. He was sent from Agirnas to Istanbul in this year and probably never turned back. But, we can assume that he was in a relation with his village and his relatives, as he requested Sultan Selim II not to send his relatives to Cyprus.

In the first 6 years he spent in Istanbul, Sinan received a military training and it is thought that he participated in Rhodes campaign of Sultan Selim I. After the death of this sultan, it is certainly known that he was with Sultan Suleiman in the Belgrade Siege and Battle of Mohacs. Even though he did not receive too much training, his creativity and engineering skills in the military campaigns he participated until 1535 has attracted attention. In 1539, Sinan held the position of chief architect, which meant being the overseer of all construction work of the Ottoman Empire, for nearly 50 years. Sinan is said to have constructed or supervised nearly 400 buildings, 196 of which still survive. According to the official list of his works in *Tazkirat-al-Abniya* (Akin & Crane, 2006) he planned and supervised the construction of 92 mosques, 52 small mosques, 55 theology schools, 7 schools, 20 mausoleums, 17 pu-



Fig. 2 - Google Earth view of Agirnas Village and the surrounding area, showing Akbin Valley and two other underground cities in the village.

Fig. 2 - Panoramica da Google Earth del Villaggio di Agirnas e dell'area circostante con la Valle di Akbin e altri due villaggi con Città Sotteranee.

blic kitchens, 3 hospitals, 6 aqueducts, 10 bridges, 20 caravanserais, 36 palaces and mansions, 8 vaults and 48 baths. This is the biggest number of buildings constructed by a single architect in the world until today. The bridge he had built on Drina River in Visegrad / Bosnia is now a UNESCO World Heritage Site.
Within the age of 70, Sinan had completed the Suleymaniye Mosque in Istanbul (fig. 3).
This building, situated on one of the hills of Istanbul facing the Golden Horn and built in the name of Suleiman the Magnificent, is one of the symbolic monuments of Ottoman Empire. After this work, Selimiye Mosque that he had built in Edirne, in the name of Sultan Selim II, is the most outstanding example of the level of achievement reached by him.
Sinan completed this mosque when he was 80 years old and reached his artistic peak with the design, architecture, tile decorations and stone workmanship displayed at this mosque (Kuban, 2011). He died in 1588 and was buried in Istanbul, in a small tomb of his own design just outside the walls of Suleymaniye Mosque and across a street named 'Mimar Sinan Caddesi' in his honor.
Sinan left five different autobiographical accounts that provide details of his life and works. Based on information dictated by him to his friend Mustafa Sai Çelebi shortly before his death, these accounts gives detailed information about his life and his buildings. In addition to these autobiographical sources, the references about him are countless. For a comprehensive list of references we suggest Ihsanoglu, 1988 and Mulayim, 2011.



Fig. 3 - A miniature of Mimar Sinan (on the left corner) supervising the construction of Sultan Suleiman's tomb, from Seyyid Lokman's Tarih-i Sultan Suleyman (c. 1579) (Necipoglu, 2010, p. 17)
Fig. 3 - Miniatura di Mimar Sinan (nell'angolo a sinistra) raffigurato mentre supervisiona la costruzione della Tomba si Suleiman, da Seyyid Lokman's Tarih-i Sultan Suleyman (c. 1579) (Necipoglu, 2010, p. 17)

The Underground City

Ottoman land registers have documented that Sinan the Architect's house in Agirnas belonged to his family (fig. 4). The restoration and environmental planning of this house was conducted by a team under the leadership of Prof. Metin Sozen between the years 2006-2008 (Sozen, 2004).

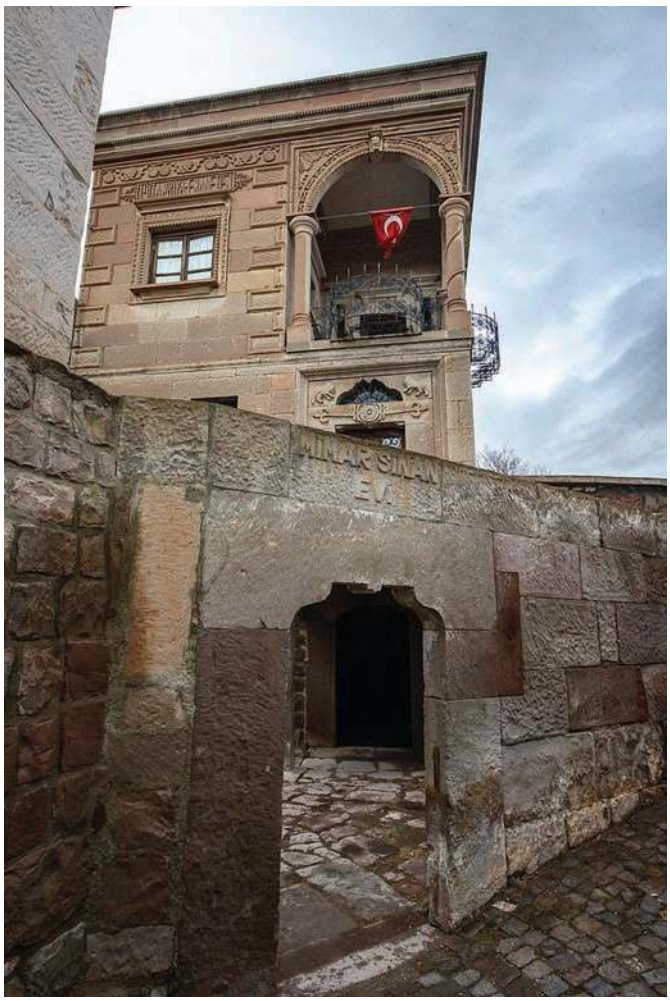


Fig. 4 - Entrance to the courtyard of Mimar Sinan's museum-house (photo A. E. Keskin).
Fig. 4 - L'ingresso al cortile della casa-museo di Mimar Sinan (foto A. E. Keskin).

A part of the underground buildings under this house has been cleaned, organized and opened to visit during this work. With this organization, it was understood that the underground city did not only cover under Sinan the Architect's house, but that all the old houses in Agirnas were connected to each other via underground structures as a cobweb.
Many house owners have shut down the connection tunnels by building mason walls to prevent reaching to their houses from underground.
The underground complex below Sinan the Architect's house is spread to a total area of 1.850 square meters in double storey (fig. 5).
As some of the interconnections have been cancelled, we see four different underground structures below Sinan's house today, but it is obvious that they were one single structure.
On the other hand, the continuation of the first and fourth underground structures below the neighbouring houses and the different exits to the surface proves that the complex underground structure in Agirnas Village dates from centuries ago.
The existence of four mill stone doors, three of them *in situ*, within the fourth underground structure makes it obvious that the structure, at least for a certain period, was built for protective purposes (figs. 6 and 7).

But, as the defensive concerns were overcome by time, these underground structures have suffered structural change. As a result, today there are four separate underground structures within Mimar Sinan Underground City Complex.

The first underground structure right next to the museum house can be reached through a big room whose ceiling is supported by stone vaults.
These big underground room with a barrel vault roof which is very common in many places of this building

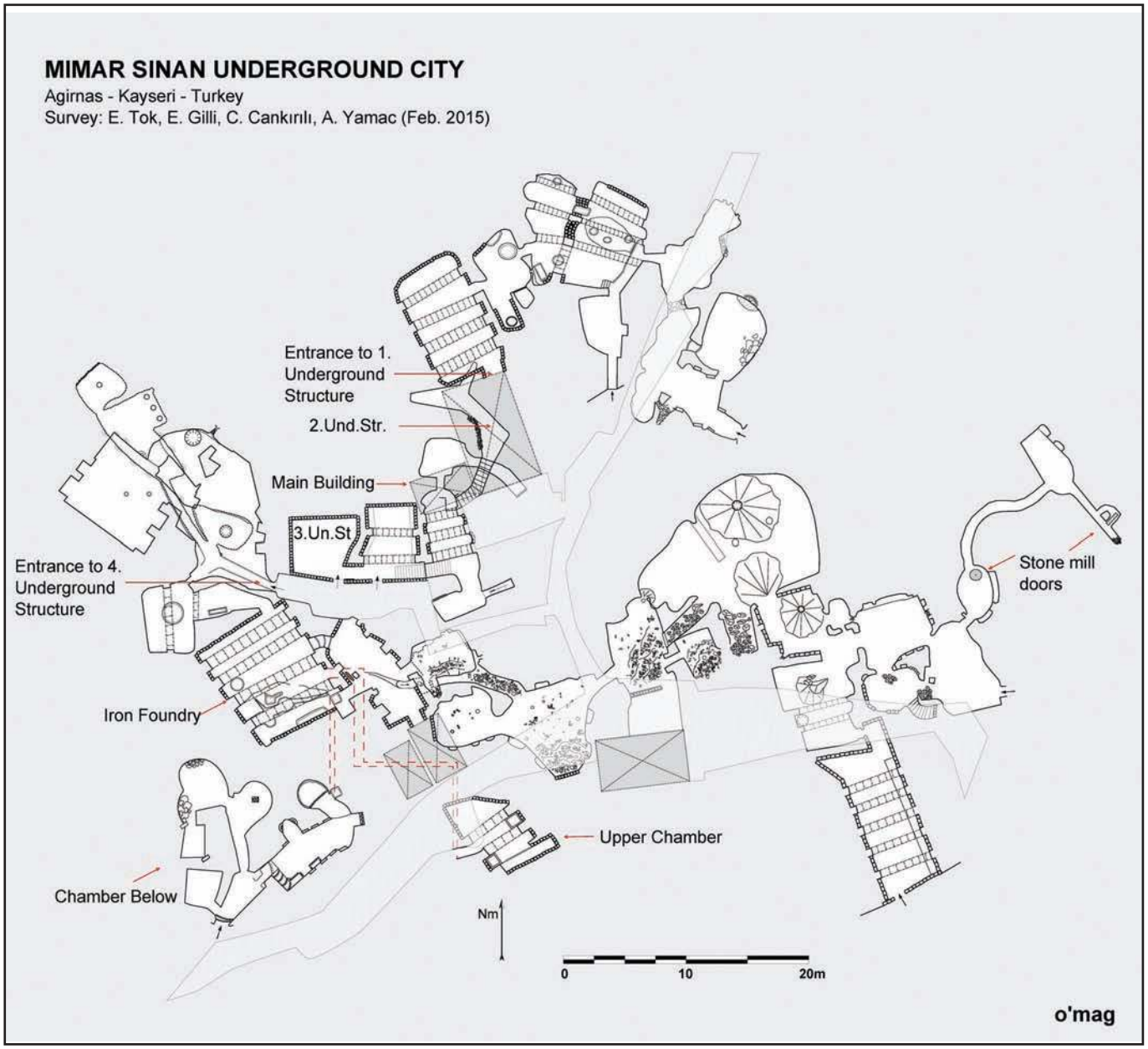


Fig. 5 - Map of Mimar Sinan Underground City Complex (survey E. Tok, E. Gilli, C. Cankırılı, A. Yamac).
Fig. 5 - Planimetria del Complesso della Città Sotterranea realizzata da Mimar Sinan (rilievo E. Tok, E. Gilli, C. Cankırılı, A. Yamac).



Fig. 6 - First mill stone door after the entrance of 4. Underground Structure (photo C. Cankirili).
Fig. 6 - Prima porta macina dopo l'ingresso nel punto 4. della mappa di fig. 5 (foto C. Cankirili).

and also, below many houses of Agirnas Village, is probably the oldest structural design of the village, as mentioned in Sozen, 1988 (fig. 8).
This first underground settlement continues to the east with different rooms and under the neighbouring houses as it can be seen in the plan (figs. 9 and 10).
Second underground structure is inside the main building and is reached from the below of stairs going up. It is a small storage area whose both connections to other neighboring underground structures are closed with stone masonry. The holes in the ground of this small structure's main room for the placement of jars show us the main aim of this building (fig. 11).

On the side of the main building, a third underground structure reached through a narrow alley (fig. 12) is another independent storage area.
Although it is possible that this building could be a living area connected with other underground structures, it can be seen that it has lost this function centuries ago and started to be used as storage.
The largest and the most important one of all the underground structures below Sinan's house is the fourth structure.
This underground structure's entrance is by the end of the same alley mentioned above (fig. 13).

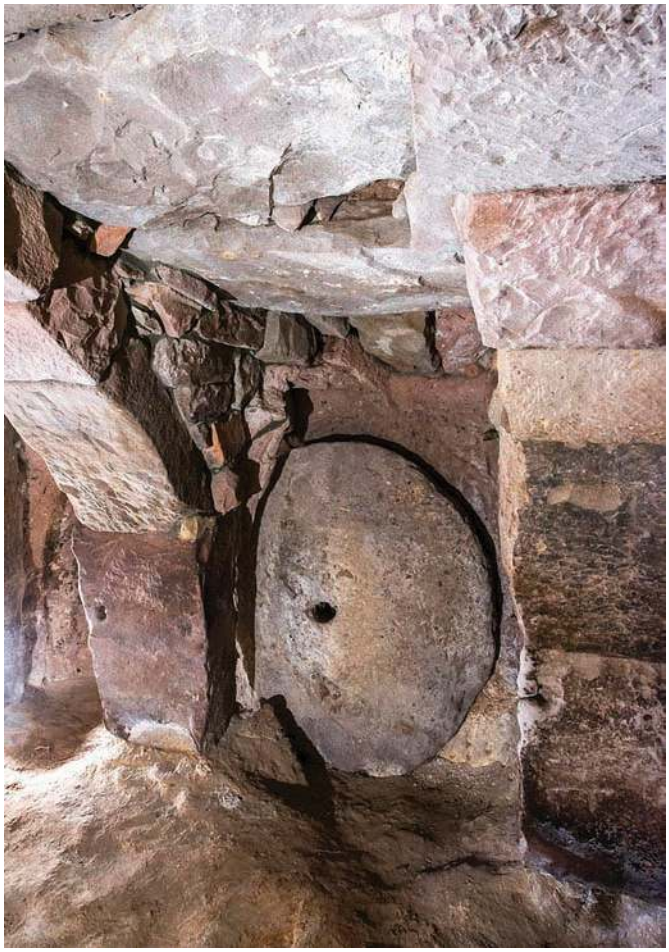


Fig. 7 - Second mill stone door in 4. of Underground Structure (photo A.E. Keskin).
Fig. 7 - Seconda porta macina dall'ingresso del punto 4. della struttura sotterranea (foto A.E. Keskin).



Fig. 8 - Third chamber of 1. Underground Structure with a barrel vault roof. The farthest vault is an original 15. century structure, two front ones are contemporary restorations (photo C. Cankirili).
Fig. 8 - Panoramica della terza camera del punto 1 della struttura sotterranea con la volta a botte. Sullo sfondo è ancora presente la volta originale risalente al XV secolo, mentre la parte anteriore risale a un restauro contemporaneo (foto C. Cankirili).

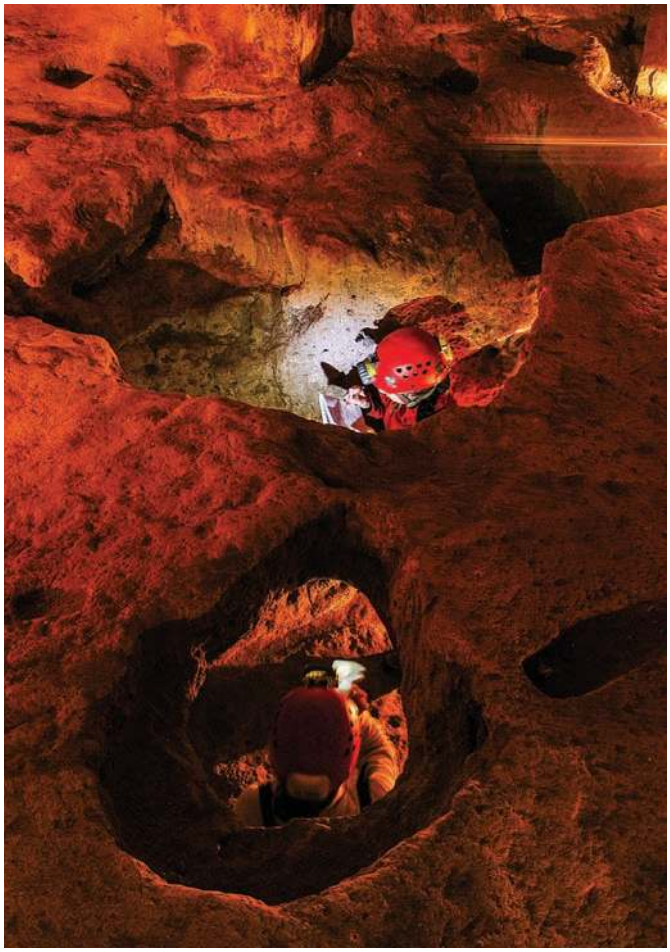


Fig. 9 - A small second floor room seen from the semi-collapsed roof holes in the depth of 1. Underground Structure (photo C. Cankirili).
Fig. 9 - Una piccola stanza al secondo piano visto dai fori del tetto semi-crollato in fondo al sito 1. della struttura sotterranea (foto C. Cankirili).



Fig. 10 - Another small second floor room of 1. Underground Structure (photo C. Cankirili).
Fig. 10 - Un'altra piccola stanza alsecondo piano del sito 1. della struttura sotterranea (foto C. Cankirili).

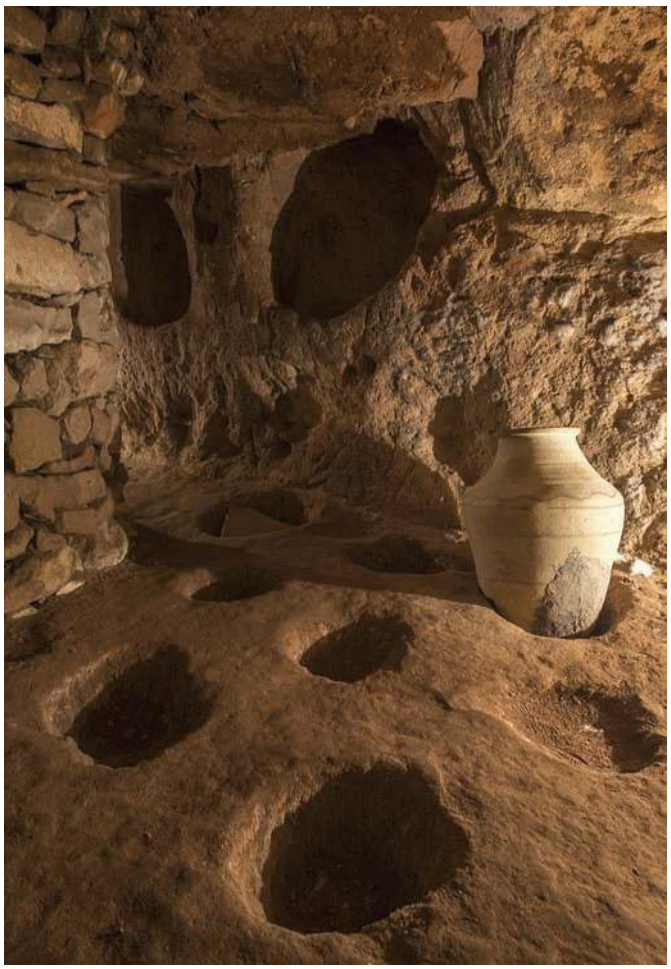


Fig. 11 - Storage area of 2. Underground Structure. Stone wall closing the connection to other parts can be seen on the left side of photo (photo A.E. Keskin).
Fig. 11 - Area di stoccaggio del sito n. 2. della struttura sotterranea. Sul lato sinistro della foto si nota la parete di pietra che chiude il collegamento con gli altri ambienti (foto A.E. Keskin).

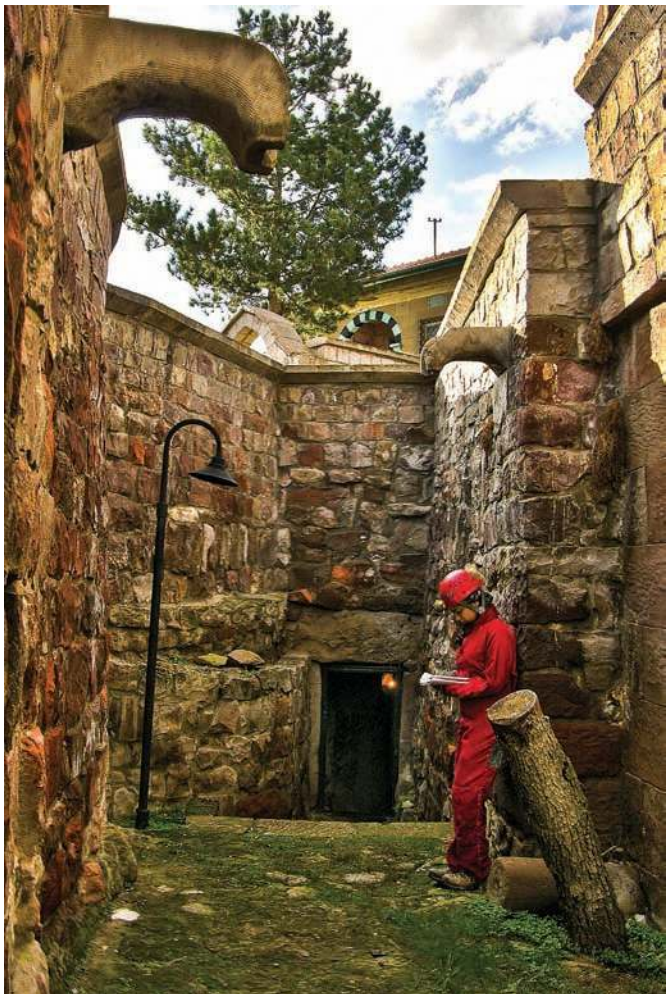


Fig. 12 - Narrow alley on the south of main building, reaching to 3. and 4. underground structures. Entrance to 4. Underground Structure is on the back (photo C. Cankirili).
Fig. 12 - Lo stretto vicolo, a sud dell'edificio principale, che consente l'accesso ai punti 3. e 4. della struttura sotterranea. L'accesso al punto 4. si trova sul retro (foto C. Cankirili).



Fig. 13 - Main chamber of 4. Underground Structure with a barrel vault roof (photo C. Cankirili).
Fig. 13 - La Camera principale del punto 4. della struttura sotterranea con la volta a botte (foto C. Cankirili).

Towards the south of this entrance, in a chamber with a barrel vault roof, there are furnaces which are considered to be an iron foundry (fig. 14).
After this atelier, the underground structure continues to east and exits the front street after passing inside a house. The structure is constructed as double storey until this part and cleaned and opened to tourism (fig. 15).
After this touristic section, it continues to the underneath of other houses with a narrow connection.
Those following parts of the underground city are not cleaned yet (fig. 16) and, more interestingly, some of them are still used by the inhabitants of neighbor houses.
The last gallery reaching to east is clogged with debris, and another mill stone door emphasizes the first construction aim of the structure.

Conclusion

Mimar Sinan Underground City is very important; not only because it is underneath the house of the grand architect of the Ottoman Empire, but also because it has a documented occupancy for at least 500 years.

The possibility to track the architectural changes of this building, which was originally constructed for protection and then transformed for occupancy or storage within the centuries, gives us a chance to observe the architectural transformation of an underground city.
We surveyed two other underground cities at Agirnas, which are very near to Mimar Sinan Underground City. In the future, we believe and hope that, by opening all the connections and making a general arrangement, this 'underground village complex' will gain an international fame.



Fig. 14 - Iron foundry atelier in 4. Underground Structure (photo A.E. Keskin).
Fig. 14 - Fonderia per il ferro nel punto 4. della struttura sotterranea (foto A.E. Keskin).



Fig. 15 - A small second floor room in 4. Underground Structure (photo A.E. Keskin).
Fig. 15 - Piccola stanza al secondo piano del punto 4. della struttura sotterranea (foto A.E. Keskin).

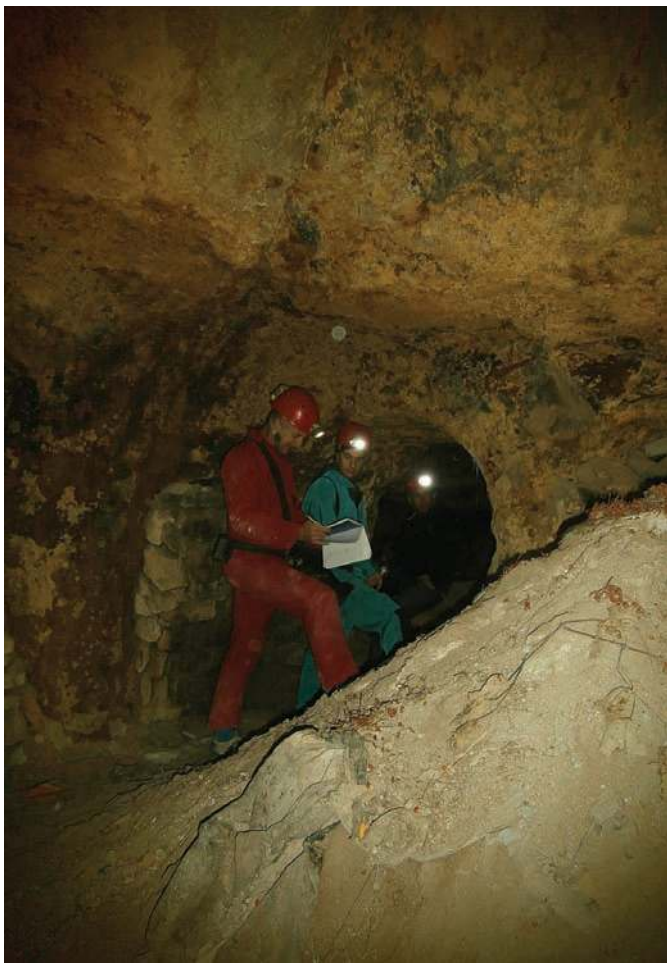


Fig. 16 - One of the abandoned rooms in the last part of 4. Underground Structure with debris from the roof (photo A. Yamac).
Fig. 16 - Una delle camere abbandonate nell'ultima parte del settore 4. della struttura sotterranea con detriti caduti dal tetto (foto A. Yamac).

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