Architectural Features of the Byurakan Observatory Complex

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Abstract

The world-famous Byurakan Observatory was founded by two prominent Armenian intellectuals, Academicians Viktor Ambartsumian and Samvel Safaryan. This complex is a vivid witness to the synthesis of scientific and architectural thought, as a result of which the Observatory has become an exemplary scientific space and cultural monument.

Architects Samvel Safaryan, Rafael Israelyan, Sargis Gurzadyan designed the administrative building and two telescope towers, the guesthouse building and the construction works, architects Martin Mikaelyan, Varazdat Arevshatyan, and Margarit Hayrapetyan contributed to the design of the Observatory complex.

The Byurakan Observatory is a unique architectural ensemble that reflects the influences of post-Tamanyan Armenian national romanticism with later Soviet modernism. Thus, it is an integrated whole, each building harmonizing with historical environment, making the valuable complex a synthesis of medieval heritage and modern architectural approaches.

Keywords: *Architecture, Byurakan, observatory, Viktor Ambartsumian, Samvel Safaryan, Rafael Israelyan, Sargis Gurzadyan, Martin Mikaelyan, Soviet modernism.*

The Byurakan observatory was founded in 1946. Architect Samvel Safaryan designed the administrative building and two telescope towers of the observatory in the 1940s-1950s. Architect Rafael Israelyan also participated in the design work of the observatory's guesthouse building. During the 1960s-1980s, architect Sargis Gurzadyan carried out design and construction works. Architects Martin Mikaelyan, Varazdat Arevshatyan, and Margarit Hayrapetyan also contributed to the design of the observatory complex. Thanks to them, the Byurakan observatory became a unique architectural ensemble, reflecting the influences of post-Tamanyan Armenian national romanticism and, later, Soviet modernism blended with functional rationalism.

Several telescope towers have been designed and built in Armenia (in Yerevan, Byurakan, and the pioneer palace complex in Ejmiatsin), but the structures of the Byurakan observatory stand out for their unique character.

The university telescope tower designed by Alexander Tamanyan in Yerevan's Tamanyan student district, with its classical architectural composition, resembles the small temple of San Pietro in Montorio, Rome, designed by the Italian architect Donato Bramante in 1502. However, built from local pink tuff, this charming structure harmonizes with the environment and has become one of Tamanyan's finest architectural achievements.

In the 1940s, when designing the twin telescope towers of Byurakan, architect Safaryan had the option to rely on the architectural composition of the already constructed Tamanyan-designed tower. However, his basis and inspiration were much deeper. He was well aware of the medieval historical

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and architectural monuments of Byurakan and Aragatsotn. He was also a contemporary of the post-Tamanyan architectural school, and in his design explorations, he masterfully combined these elements with Armenian medieval architectural styles.

Safaryan understood that the challenge was not only to design towers and a main building; he had to construct the entire Byurakan observatory complex. The observatory's 10-hectare garden area blends harmoniously with the old rural environment. The buildings do not exceed two floors, maintaining a balanced proportion. Safaryan aimed to create an ensemble characteristic of Armenian medieval architecture, following the best traditions of Armenian architectural composition. The arrangement of the buildings on this small plateau is directed toward Mount Ararat, reinforcing the connection between the structures and nature (Safaryan & Barkhudaryan (2007) 56). This aspect was crucial for Safaryan, as he had observed similar spatial compositions in numerous medieval Armenian structures.

Safaryan also sought to create an ensemble that could be called "historical-celestial". The heights of Aragats contain the monuments left by our ancestors, such as vishapakars (dragon stones). In the fourth century, the Arshakuni Mausoleum was built in Aragatsotn, alongside the Kasagh Basilica in Aparan and the mighty architectural landmarks of Talin, Amberd, and others.

In such an environment, a new, significant structure was to rise in the XX Ce. – the Byurakan observatory, which had to merge with its surroundings as an integral architectural component (Safaryan & Barkhudaryan (2007) 181).

At the entrance of the Byurakan astrophysical observatory, a grassy tree-lined path leads to the main research building, which crowns the complex. This quadrangular building houses offices, laboratories, and a conference hall. The facade is composed with precise forms and restrained ornamentation, emphasizing harmony. This significance is accentuated by the slightly protruding twin towers beside it. The design of the two telescope towers by Safaryan suggests adherence to the post-Tamanyan style. However, they are more restrained, monumental, and closer to medieval Armenian architectural forms, evoking the artistic solutions of Byurakan's medieval religious structures (e.g., symmetry, window cornices, etc.). The towers are octagonal, with narrow, elongated windows – one on each facet. The towers are crowned with a toothed cornice, below which a carved decorative band encircles the structure, featuring circular and rectangular geometric patterns across all eight facets. Safaryan's innovative approach resulted in observatory buildings that were not merely adorned but embodied a crystallized architectural form (Safaryan & Barkhudaryan (2007) 179).

The design of the observatory's guesthouse wing was carried out by Safaryan in collaboration with architect Rafael Israelyan. The first floor of the guesthouse includes a dining hall, a lounge, and other common areas, while the second floor is dedicated to bedrooms. The precisely cut tuff stone facade is designed with broad surfaces, enriched by sculpted open staircases leading to the second floor on both the left and right of the main entrance. This facade treatment gives the building a distinctive hotel-like appearance. Here, the talents of two great masters intertwined, making the guesthouse an integral part of the complex. Israelyan's contribution added artistic ornamentation, enriching the overall composition with distinctly Armenian traditional forms.

Israelyan's influence is especially evident in the architectural-artistic composition of the observatory's guesthouse wing. The arches, stair supports, and entrance designs reflect the well-known tendencies of medieval Armenian architecture, incorporating ornamental details into the facade design. For example, the open staircases leading to the second floor, with their composition and decorations, resemble the base of the "Mother Armenia" monument in Victory Park, Yerevan, also designed by Israelyan.

Opposite the guesthouse, nestled in the garden, is the residence of the renowned academician Viktor Ambartsumian. It was designed in 1950 by architect Martin Mikaelyan, in collaboration with Margarit Hayrapetyan. Mikaelyan also worked on the interior design of the two-story villa, along with Varazdat Arevshatyan.

Architect Sargis Gurzadyan brought new life to the complex, adopting the Soviet modernist style. His projects (1953-1970) completed the Byurakan observatory complex, including the towers for the large and small reflecting telescopes, a conference hall, a laboratory wing, a workshop, and a gated entrance. Gurzadyan had been involved in the complex's planning from the beginning (he worked in Safaryan's studio from 1951; see (Ter-Minasyan, 2009)). His contribution to the guesthouse and

main building, designed by Safaryan and Israelyan, is undeniable. Gurzadyan developed their working drawings as well as details for artistic decoration.

The Conference hall designed by Gurzadyan in 1957 had a different architectural approach. His emphasis on using reinforced concrete and glass surfaces to achieve volumetric lightness is evident, a concept he later applied in the Kapan City Cultural House (1972) and the Polytechnic Institute complex in Yerevan's Avan district (1980). Gurzadyan's next project at Byurakan was the Small Telescope Tower (1954). Although the tower's composition resembles the towers designed by Safaryan, it differs from them in several ways. While Safaryan used flat, faceted surfaces for his towers (similar to the treatment of some medieval religious structures' drums), Gurzadyan's tower features concave surfaces. The sequence of arches, with their distinctive interplay of light and shadow, gives the tower a sense of lightness, while the design of the entrance's upper section enhances the artistic character of the structure.

The laboratory building designed by Gurzadyan (1975) features a strict and monumental architectural style (especially the entrance), seemingly emphasizing the utmost importance of the scientific research conducted at the observatory. The open arcade on the third floor visually "lightens" the structure as it ascends towards the Sky and Space, symbolizing the celestial realm in which scientific work takes place.

Interestingly, in designing the mirror solution for the Great Telescope, Gurzadyan primarily relied on the columned drum of the dome of Khorakert Church (XIII Ce.), creating dozens of sketches. Many of these are preserved in the National Museum-Institute of Architecture[1]. It turns out that the architect always sought to integrate the tower into its surroundings, carefully considering intricate details requiring a comprehensive solution – sidewalks, green zones, parkings, fencing, entrances, small architectural forms, landscaping, and more. The sketches were equally viable, but the architect ultimately chose the version that was realized. As a result, a tower was built that has no equivalent in either Armenia or among observatories worldwide. It is unique and memorable, both in terms of architecture and artistic composition.

Thereby, the Byurakan observatory complex became an integrated whole, with each building harmonizing with its historical environment rather than standing alone. The structures blend seamlessly with the architectural heritage of Amberd, Ohanavan, Tegher, and Byurakan (Safaryan & Barkhudaryan, 2007).

This world-renowned complex was founded by two prominent Armenian intellectuals, Academicians Viktor Ambartsumian and Samvel Safaryan. This complex is a vivid testament to the synthesis of scientific and architectural thought, as a result of which the Byurakan observatory has become an architecturally organized exemplary space[2] and, thanks to Samvel Safaryan (Harutyunyan, 2002), Rafael Israelyan, and Sargis Gurzadyan, has become a scientific and cultural monument[3].

References

Harutyunyan, V. 2002. *Architect Samvel Safaryan.* Yerevan: "NAS RA Gitutyun", 68 p. (in Arm.).

Safaryan, Yu., & Barkhudaryan, A. 2007. *Architect Samvel Safaryan.* Yerevan: 364 p. (in Arm.).

Ter-Minasyan, A. 2009. *Sargis Gurzadyan (albom).* Yerevan: "Printinfo", 96 p. (in Arm.).

[1] Al. Tamanyan National Architecture Museum-Institute's Fund – NAFI-G.S.-15/1-15/6.

[2] In 2013, the Government of the Republic of Armenia granted the Byurakan observatory the status of a National Heritage site.

[3] According to architect Murad Hasratyan, the Byurakan observatory complex, along with the second government building of Armenia, the Presidium of the National Academy of Sciences, the Medical University, and the building of the Chinese Embassy, all designed by Samvel Safaryan, constitute the "golden fund" of XX Ce. Armenian architecture (Safaryan & Barkhudaryan (2007) 239).

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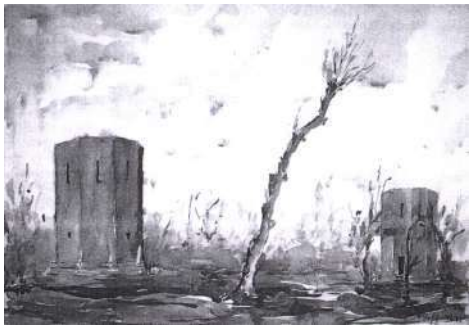
7) 

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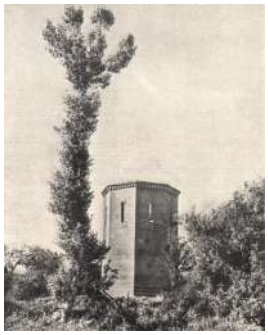
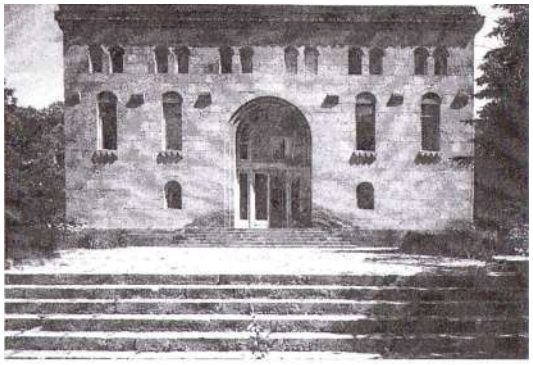
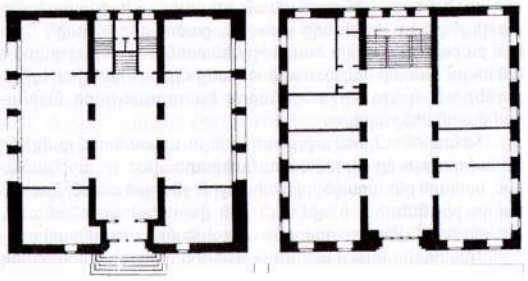
9) 





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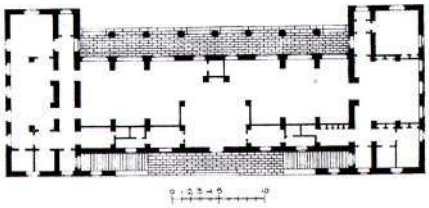

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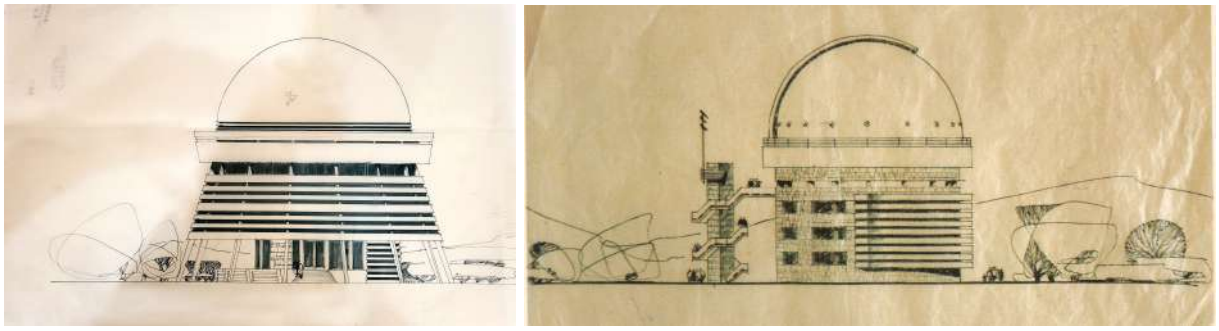

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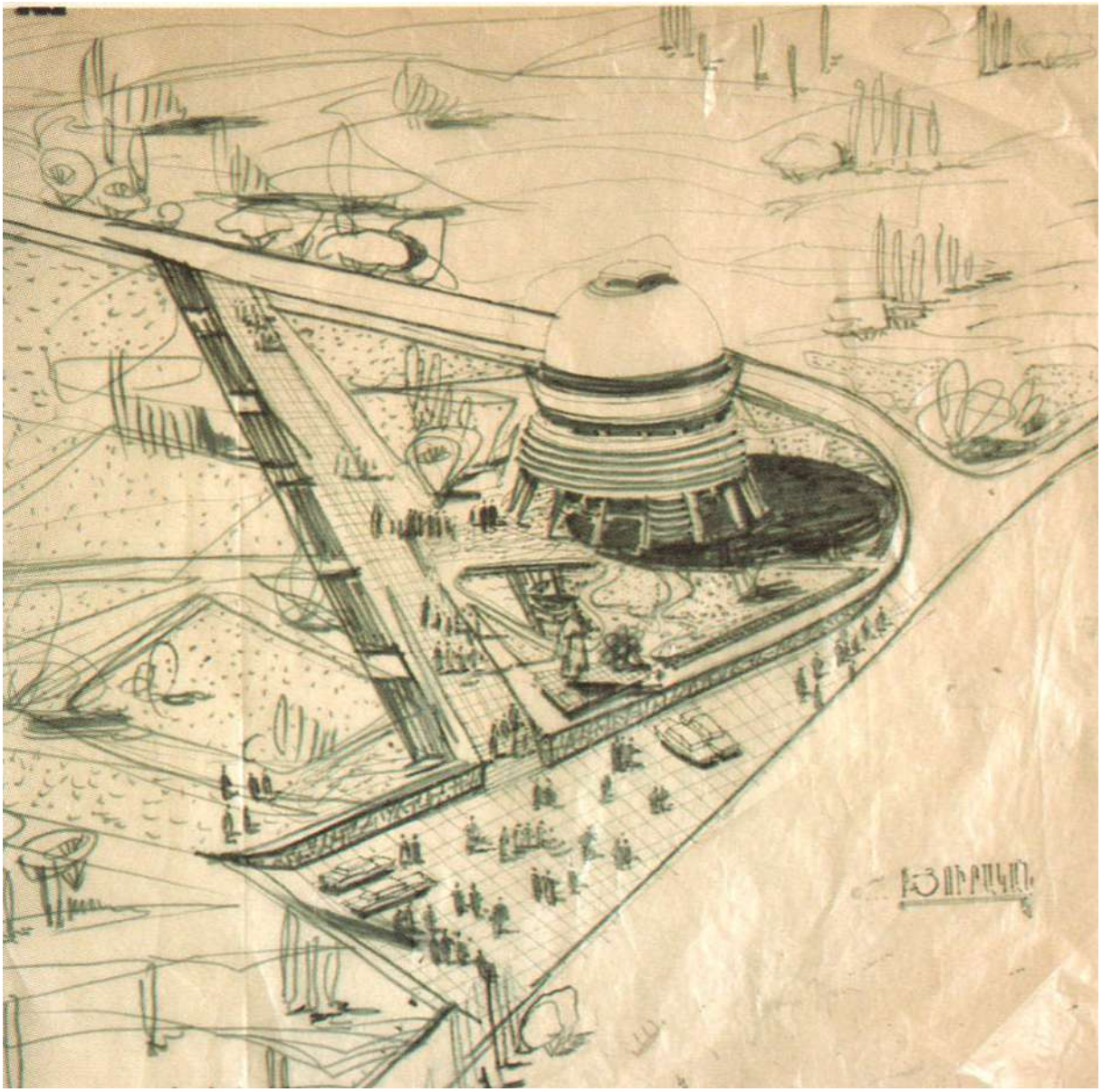

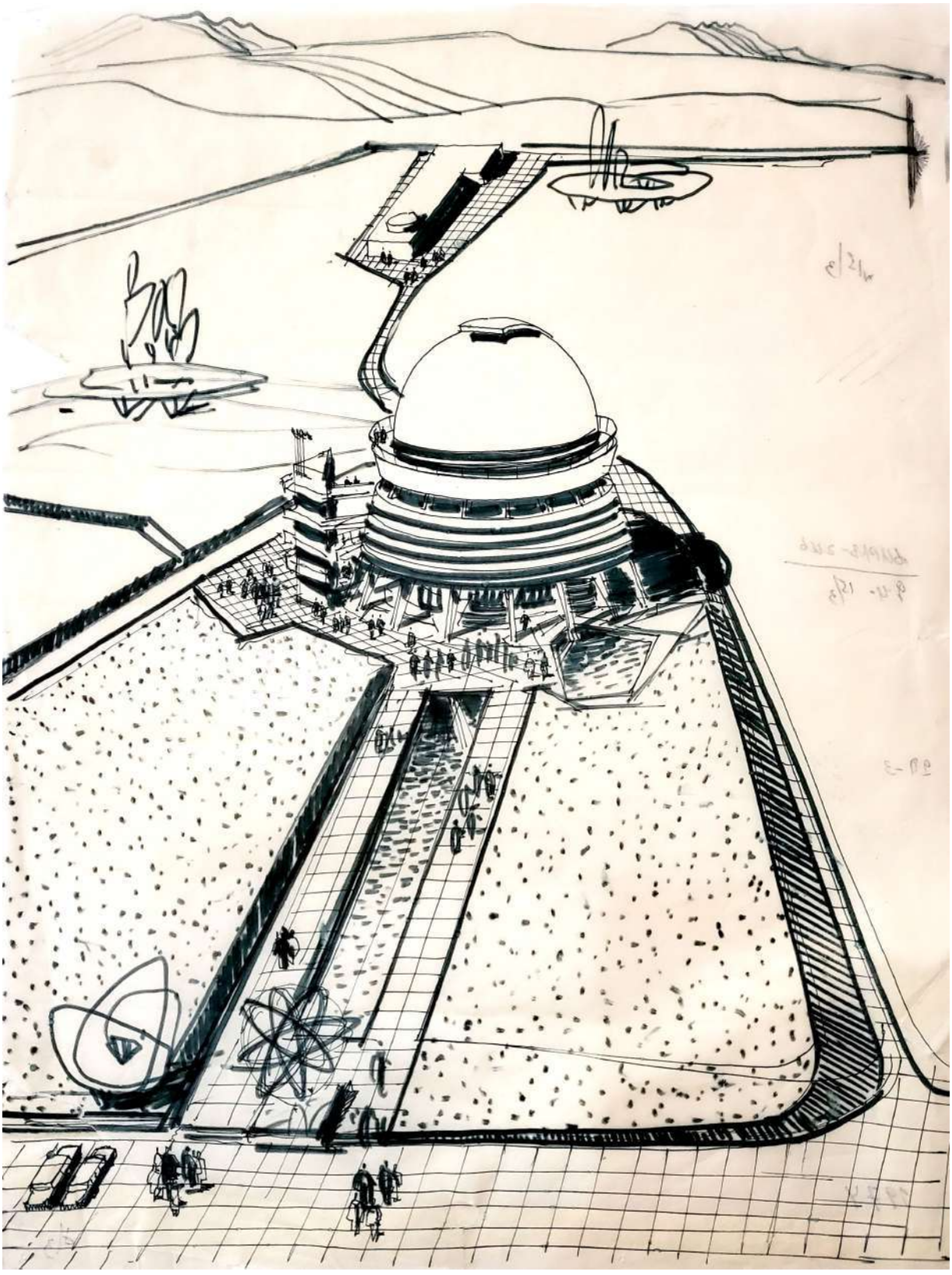

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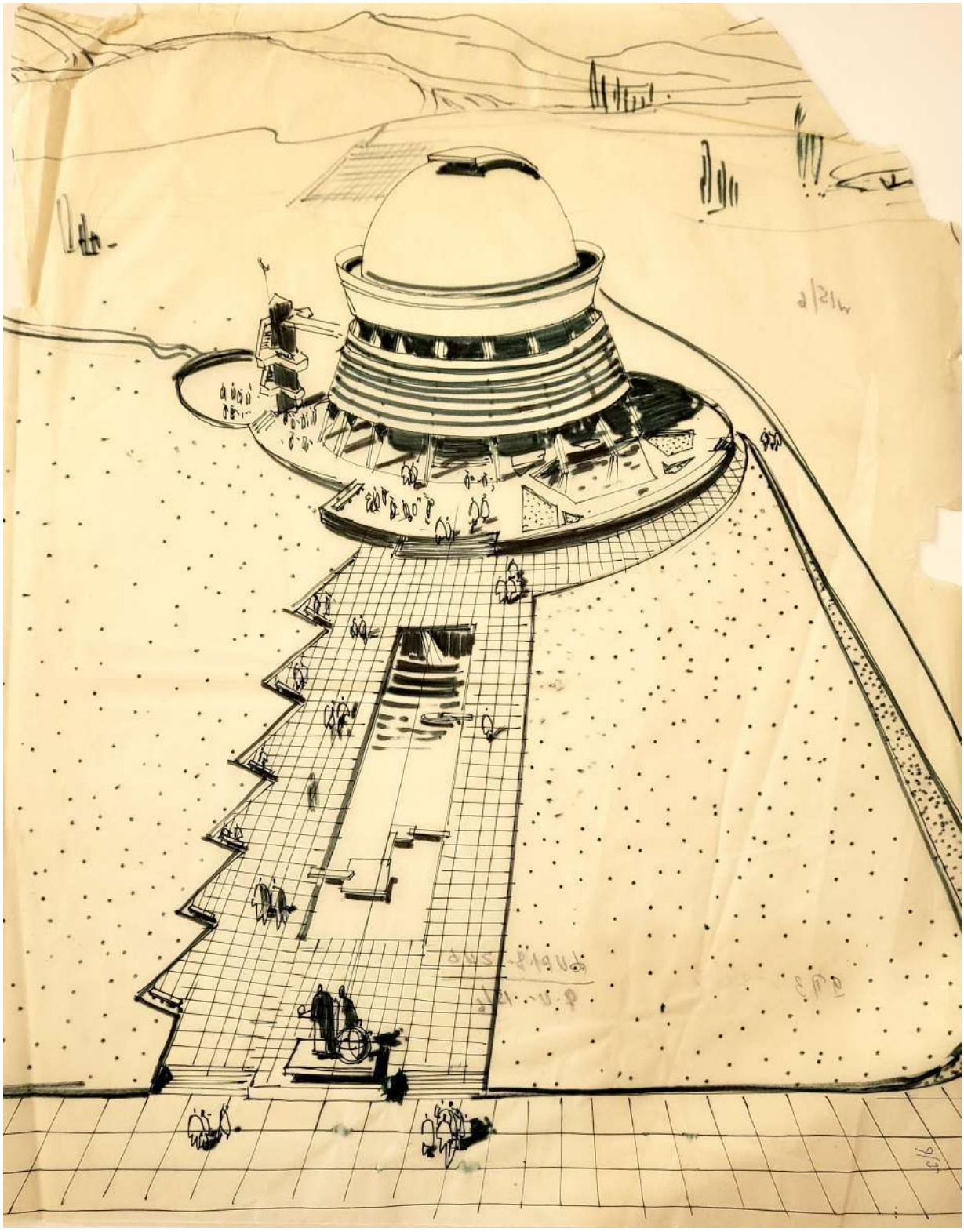
19) 

Figures. 1) General view of Byurakan observatory; 2) Main building of Byurakan observatory; 3) Preliminary design of the general view of Byurakan observatory by S. Safaryan, 1945; 4) Tamanyan's university telescope tower in Yerevan; 5) San Pietro in Montorio temple in Rome, designed by Bramante in 1502; 6) Khorakert Church (XIII Ce.); 7) Architect M. Mikaelyan, "Towers," watercolor painting; 8) Telescope tower of Byurakan observatory; 9) Telescope tower under construction, 1949; 10) Facade and floor plans of the main building of Byurakan observatory; 11) Facade and floor plan of the guesthouse; 12) Guesthouse of Byurakan observatory and decorative details; 13) Residence of Viktor Ambartsumian, architect M. Mikaelyan; 14) Decorative details of Byurakan observatory; 15) 2.6 m telescope of Byurakan observatory; 16-19) S. Gurzadyan's Sketch versions of a 2.6 m telescope.