# Magnesia ad Maeander, the Stadium, a matter of scale

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The Stadium of Magnesia represents a typical large architecture once dedicated to sport activities, the size and the relationship with its environment, together with the remaining details, make it a specific and fascinating survey subject

The Stadium of Magnesia ad Maeandrum is situated in the southwest sector of the ancient city, it was built in the Ist century AD exploiting the slopes between two hills oriented according to a North-South axis. It was built with the logic of a great structure, with a track length of about 189 meters (638 Roman Feet) and an estimated seating capacity of 30,000 spectators, it represents a significant monumental structure in the region and for that age. It was made on the border of the main historical settlement, thus it was thought as strictly connected to the city of Magnesia, as a high quality architecture. Its archaeological investigations had taken a significant step forward since 2008, with methodic excavations, unearthing the stands and starting the discovery of its architectural parts and functional artworks. In time,

Fig. 01 - Entering the Stadium in Magnesia, September 2024.

Fig. 02 - 3D model from UAV/Drone photogrammetry, two views from the textured model version.

the stadium had suffered from multiple old damages caused by seismic activity, terrain movements, floods, vegetative overgrowth, and the looting of stone for reuse and for lime production, but even after such a long series of small and great disasters the stadium remains one of the best-preserved examples in Anatolia and the wider Mediterranean world. Extensive excavation efforts, particularly those concluding in 2018 regarding the *sphendone* (the curved end of the stadium), have revealed architectural properties that distinguish this structure from known contemporaries (Bingöl, 2020).

The reason for the creation of such a complex and extended architecture may be found in its initial dedication to serve as the venue for the *Leucophryena*, a major festival dedicated to *Artemis Leucophryene* (Bingöl, 2005). In this event a series of games were used to take place, they comprised the three


Fig. 03 - Orthophotos from SfM/IM photogrammetry of relieves with gladiator's fights and carriage's races.

primary branches of gymnastics (athletics), equestrian events (mostly horse and chariot racing) and musical competitions. It is of some interest reflecting about the fact that the musical contests were intended for the Theatron, which appears as an incomplete building, which may suggest that the stadium may have served a multi-purpose function. Overall this last feature was not influencing the architectural choices in planning this architecture, which appears oriented to host efficiently equestrian activities and multiple parallel sport exhibitions or matches.

## THE STADIUM ARCHITECTURE

The architecture of the stadium features three main technical installations for the administration of races: the start structure, located at the North end, features a complex arrangement of 24 pillars and arches. Excavation of the *postaments* (bases) revealed slots for a mechanism designed to ensure a simultaneous start for all the runners in the race.
The second is the finish line: Located 189 meters South of the start, the finish line is marked

by four double-prismatic free-standing pillars. The spaces between these pillars likely held ribbons to determine the victor. The third Structure is represented by the herms, which are the finish line pillars decorated with double busts, featuring both bearded and clean-shaven figures. These likely commemorate famous athletes, or they may symbolize a philosophical reflection on the duality of victory and life somehow recalling the "Two-Faced Janus" (Janus Duplex) allegorical figure (Casini, 2018). While the Leucophryena included equestrian events, architectural analysis suggests the stadium was ill-suited for heavy chariot racing. The presence of fragile free-standing pillars and Herms at the finish line would have posed a severe collision risk during the high-speed turns required in chariot races. It is therefore posited that the stadium hosted only symbolic or light equestrian events, while it is possible to suppose that full-scale chariot races were likely held in a separate, as-yet-undiscovered hippodrome. The stadium represents a multi-scale architecture, even in ruins the specific features in Magnesia demonstrate how the massive body of the main building is connected to the landscape itself, It is a sign and a trace visible from the distance and its “U” shape create a spectacular entrance from the side of the city. At the same time it soon varied its scale at the dimension of the details, with well defined particular use of rich materials, like multicoloured stones and marbles, creating a constant attention and curiosity in the visitor and a fascinating passage from territorial scale to minimal scratches on stones.

The stadium contains also a significant epigraphic archive, presenting a series of epigraphy elements connected to the ancient social stratification of the city. This is manifest with inscriptions found on seat backrests and podium façades offering insights into the social, economic, and political levels of the inhabitants of Magnesia.

But there are also writes that testify inter-city relations: an inscription on the podium marks a section reserved for the "Ephesians," indicating a formal protocol for hosting spectators from rival or neighboring cities. Other inscriptions tell about professional associations, like those on the 11th, 12th, and 13th cercises, while specific writings name unions and associations. These areas functioned not only as spectator seating but as designated spaces for guild meetings. In the end, the epigraphic writes testify the elite patronage: specific rows were allocated to prominent families. For instance, the "Council of Elders" and members of the Claudian family held reserved seating.

In the variety of sculpted writes, a particularly notable inscription, *Mangragoreiton*, can be found across two rows adorned with bull heads and a lion relief. This refers to the producers of mandrake (Mandragora), a root characterized by a sort of anthropomorphic shape, which historically was associated with aphrodisiac and medicinal properties.

To testify the variety of spectacular activities taking place in the arena, a significant contribution may come from the podium reliefs and their

Fig. 04 - Orthographic view of the whole stadium, September 2024.

clear iconography. In fact, a distinct characteristic of this stadium is the extensive use of reliefs adorning the podium walls of the arena. Although the original plan likely called for approximately 150 reliefs, only twenty-six have been found during the unearthed operations across the twenty-seven cercises (wedge-shaped seating sections). The most significant reliefs were dedicated to athletic and equestrian depiction: the reliefs portray various activities, like horse and chariot racing, alongside depictions of awarded prizes and some talamoni probably used to gather some "good luck" in superstitious gesture from the participants to the competitions. The reliefs representing gladiatorial contexts are undoubtedly extremely fascinating, and capture significant attention. Recent excavations have uncovered these reliefs depicting single and couples of gladiators. However, distinct architectural evidence suggests that the stadium was not the place of Bloody, deadly confrontations, so these reliefs probably do not represent lethal combats. Unlike other structures in the same area, dedicated to gladiatorial matches, likes the *stadia* at Perge or Aphrodisias, Magnesia lacks the protective barriers or high walls necessary to shield spectators from wild animals or desperate combatants. Consequently, it is hypothesized that these reliefs deficit gladiatorial training or exhibition matches rather than fights to the death. Nowadays, the principal group of reliefs is usually protected by a robust metal cage, used to avoid damages from the visitors or potential thieves or vandals.

## DIGITAL SURVEY

To digitally document the Stadium and its rich set of artistic and cultural/social elements, it was planned a three step session based on photogrammetry, in September 2024, a team composed by G. Verdiani, A. Camiz and U. Özdemir operated a general coverage of the whole architectural surface of the stadium, operating about 1000 drone/UAV shots and about 5000 terrestrial shots, all these data were processed in a single photogrammetry producing a well detailed general model of the stadium, with an high level of details and full texturing. In September 2025, a unit composed by G. Verdiani, E.C. Giovannini, F. Tioli, A. Rosone, C. Mastroberti and E. Miho operated the photogrammetry of all the reliefs of the podium, getting them in a lucky moment, with all the cages temporarily removed. This produced about 4000 pictures from which It was obtained a full set of very high resolution models and orthophotos of these particular artworks.

The models derived from this second session showed interesting aspects, in fact, It is possible to notice some original features: the size of the stones in the podium is constant in height (about 82 centimetres) while the widths may vary. This variation sees the realization of the reliefs on one main stone, but then, they are easy at having parts on the consequent block, even for just minor details or small parts of the figures. In this way there is often the presence of richly sculpted stones connected to almost flat ones if not for single details. This may allow us to hypothesize the original presence of painting completing the scene and having the reliefs emerging in colours and from a flat scenario. Something impossible to verify, while time and nature have completely cancelled any trace of paint from the surfaces, but something stimulating the speculation about the original aspects of the arena and worth of further research. In the end, the third session would be planned in the future for completing the survey of the writes and decorations along the stands. The aim is developing a 3D map of this specific built heritage using the main model of the stadium as a reference for each detail making possible and easily accessible a multi-resolution model of this fascinating building.

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## Abstract

*The Stadium of Magnesia ad Maeander represents one of the most monumental and well-preserved athletic architectures of Asia Minor, distinguished by its scale, architectural complexity, and rich cultural significance. Built in the first century AD along the slopes of two hills, the stadium accommodated approximately 30,000 spectators, closely connected to the city's civic life. Archaeological investigations have progressively revealed its architectural layout, installations for athletic competitions, and extensive sculptural and epigraphic programs. Originally associated with the Leucophryena festival dedicated to Artemis, the stadium hosted a wide range of events. Architectural analysis, however, suggests that its design was optimized primarily for athletic and light equestrian activities rather than full-scale chariot racing. Of particular importance are the reliefs decorating the podium walls and the numerous inscriptions carved on seating and architectural elements, which provide valuable insights into social stratification, professional associations, inter-city relations, and elite patronage within Magnesia. Recent digital documentation campaigns employing UAV and terrestrial photogrammetry have enabled the creation of high-resolution 3D models of the stadium and its sculptural elements. These digital datasets support multi-scalar analysis, enhance interpretative possibilities, and contribute significantly to the long-term study, conservation, and dissemination of this exceptional architectural complex.*



## Keywords

Architecture; Archaeology; 3D model; UAV; Drone; photogrammetry; mesh; texture



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