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Original article

Astronomy, topography and landscape at Akragas' Valley of the Temples

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ABSTRACT

The issue of the orientation of Greek Temples has been the subject of much debate since the end of the 19th century. In fact, although a general tendency to orientation within the arc of the rising sun is undeniable, specific patterns and the true meaning remain obscure. With the aim of shedding light on this problem we present here a new, complete, high-precision survey of the temples of Akragas, the so-called Valley of the Temples UNESCO site. Our results include all temples – one of which was essentially still unpublished – and show that very different reasons influenced the choices of orientation – some symbolic, but others much more practical – beyond the general rule of orienting 'to the rising sun'. In particular, the temples of the central terrace – including the world famous temple of Jupiter – were oriented in accordance with the town's grid, while a rigorous orientation to the cardinal points is evidenced for the Aesculapius sanctuary. Finally, for two temples having 'anomalous' orientations, a stellar and a lunar proposal respectively are made.

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1. Introduction

The ancient Greeks built hundreds of magnificent temples over the course of several centuries, from the 7th century BC onward [1]. Leaving aside regional and chronological distinctions in the layout and in the column orders, these sacred buildings were always based on the same conception: an imposing rectangular construction adorned with columns on the façade. Although in many cases the presence of columned porticoes on all sides made the view of the structure enjoyable from all directions, the main principle always remained the same: a Greek temple was meant to occupy a natural place with an obviously man-made feature, and it was to be admired from the outside only.

Admission was reserved to priests and to the privileged few, and public rites were celebrated outside, in front of the temple, which in many cases was equipped with an altar and a *plateia* (religious occasions included festivals, processions and long rituals). The interior of the temple was, strictly speaking, the home of the god. The god's domestic welfare (hence, the beauty and decorum of the building, correct insertion in the landscape, regular giving of offerings) was fundamental to assure benevolence and protection to the community. The cult image, located in the central place of the temple, was in many cases an out-and-out masterpiece, like the famous ivory-and-gold statues of Zeus at Olympia and of Athena in the Parthenon in Athens.

The positioning of Greek temples has been the subject of interesting scholarly research. For instance, a connection between the terrain on which the temple is erected and a related deity has been suggested by Retallak [2]. The relationship with the landscape as a whole was first suggested by Scully [3]. His work pioneered research on the Archaeology of the Landscape, pursuing the idea that landscape and temples formed an architectural unit that was characterized in accordance with the specific god worshipped. Occasionally, the choice of the terrain and/or of the landscape was exploited to achieve a specific orientation, while in other cases the temple architecture in itself created the sacred landscape [4]. In any case, the matter of understanding the specific orientation of the Greek temples deserves to be dealt with on its own.

The orientation of a Greek temple is preferably defined as the direction of the main axis from inside looking out, which is the direction in which the statue of the god was in principle looking, as well as being the direction along which the sun would illuminate the façade, which, as we have seen, was the scene for rites and celebrations taking place outside the temple. The majority of these monuments face the eastern horizon, mostly within the arc of the

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rising sun [5–8]. Recent research, however, has shown that eastern orientation is not the universal key to Greek temples, as was previously believed [9–13].

What appears to be a simpler situation occurs in the case of the Greek temples of Sicily. The orientation of the temples of Sicily demonstrates indeed a very clear pattern [14,15]. It has been determined that 38 out of 41 measured temples are oriented within the arc of the rising sun (Fig. 1). This sample is virtually exhaustive for all but one (studied in this paper) of the existing monuments, and clearly we have no need of any statistical analysis to conclude that orientation within the arc of the rising sun was intentional. However, in a way, we are only at the beginning. As it happens, there is no specific concentration of data, for instance, around the solstices or the equinoxes, or other dates for that matter – so how was the alignment chosen? Was it the day of foundation of the temple, or the day of the feast of the god, or what? Perhaps there was a tradition passed down from the original town of provenance? So far, attempts to gain more insight into this problem – for instance, by investigating possible groupings for patron deities – have not been successful. Matters are complicated by the fact that the calendars in use in Greek towns were luni-solar, so that alignments based on feast days would not have been calendrically effective in relation to the timing of the rituals carried out annually in front of the temple (presumably at dawn).

The orientation also appears somewhat unusual when one looks at comparable families of monuments, for instance the Italic temples (temples of the peoples inhabiting continental Italy before the Roman conquest, like the Samnites) which are oriented to the sun ascending in the sky, and the Etruscan temples, which are mostly oriented to the sun ascending or descending in the sky, that is, between the winter solstice sunrise and the winter solstice sunset [16,17]. Gonzalez-Garcia and Belmonte [18] have argued that while Greek temples in the same region may differ among themselves with regard to orientation, nonetheless the orientations as a whole correlate better with those of temples from other, culturally related regions, e.g. the temples in Sicily compared with those of South Italy.

Finally, it should also be noted that solar orientations cannot be distinguished from – eventually – stellar orientations occurring at the same declination. Thus all Greek temples oriented to the rising sun also happen to be broadly oriented towards the constellations in which the sun was rising at the epoch of construction, and can on occasion be accurately oriented to specific stars of such constellations as well as to other stars that had the same declination. A possible, specific interest by the builders in this kind of stellar target must be investigated separately case by case (see e.g. [10]).

Motivated by such a variety of open questions, we decided to approach the problem by performing a complete survey and analysis of a homogeneous and particularly significant set of temples: the world famous UNESCO site of the Valley of the Temples of Agrigento, ancient Akragas. Our results are actually quite unexpected and show that a variety of factors, not all of them astronomical, influenced the Akragantine architects.

2. The Valley of the Temples

Akragas – today's Agrigento – was one of the most important Greek colonies in Sicily, founded in 582 BC by settlers from the nearby Gela and from Rhodes. The site lies on a huge plateau, naturally protected from the north by the Athena Rock and the Girgenti Hills, and from the south by a long rib-hill, bounded on either side by the rivers Akragas and Hypsas, confluent to the south in a single water's course, at the mouth of which the port was constructed.

From the very beginning, under the tyranny of Phalaris (570–554 BC), the city was characterized by a regular urban layout, dominated by the Acropolis on the Athena Rock and bordered by the rib-hill which started to house monumental sanctuaries; in the central area were dwellings and public buildings in accordance with an orthogonal grid layout; the necropolis was located outside the city walls. In the last decades of the sixth century BC, Akragas was surrounded by massive walls 12 km long, with 9 gates. The colony reached fame and power under the tyrant Theron (488–471 BC), who defeated the Carthaginians at Himera in 480 BC, and during the years of the democracy (471–406 BC) established by the philosopher Empedocles. It is in this period that the extraordinary series of Doric temples, today comprised in the UNESCO archaeological site called the Valley of the Temples, was built.

There are as many as ten temples in the complex. We list them in the following using the traditional names [19] which are of current use in all publications on the site; it is however *fundamental* to recall that only the temples of Heracles, Jupiter and Demeter (and the sanctuary of Aesculapius, which is *extra moenia*) really belong to these deities:

- temple of Olympic Jupiter (Fig. 2): this is the largest Doric temple in the western Mediterranean. The temple was, however, left unfinished and later collapsed, perhaps due to an earthquake. It is built on a huge stand (56.30 × 113.45 meters) and was reached through a crepidoma of five steps. The most relevant architectural peculiarity comprises the stone giants (the *Telamones*), which were probably placed in each intercolumniation. The temple was

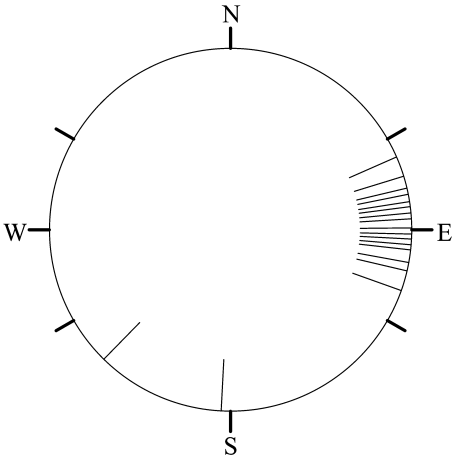

Fig. 1. Orientation of the Greek temples of Sicily.
Based on data by Aveni and Romano [14].

Fig. 2. Akragas, Valley of the Temples. The area of the Temple of Olympic Jupiter, with one of the huge Telamones in the foreground.

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