

# AN ARCHAEOASTRONOMICAL STUDY OF THE ‘NEO-PYTHAGOREAN BASILICA’ AT PORTA MAGGIORE IN ROME

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## Abstract

The so-called ‘Neo-Pythagorean Basilica’ at Porta Maggiore in Rome is one of the most famous and most discussed hypogeal monuments in Rome. It was certainly in use for a short time during the first half of the first century AD, but its purpose is still far from clear. The most probable interpretation is that it was a temple dedicated to Neo-Pythagorean cults. We describe here the preliminary results of a detailed archaeoastronomical study of the Basilica undertaken in order to contribute to the understanding of the role of this fascinating monument.

Key words: archaeoastronomy, mysteric cults, Roman history, hypogeum.

## The ‘Neo-Pythagorean Basilica’ at Porta Maggiore In Rome

The Porta Maggiore underground Basilica (see, e.g. Aurigemma 1974), a very important hypogeum of the first imperial age, was discovered in April 1917 following a ground collapse in the Roma – Cassino railway.

In the Roman epoch, this peripheral urban area, near to Via Prenestina, was called *ad Spem Veterem* and, according to classical sources, the *Gens Statilia* owned most of the plots sited there. The underground family tomb of the *Gens Statilia* is still visible today, 200 m away from the Basilica.

This is a complex consisting (Fig. 1) of a long *dromos*, only partially preserved, with a sloping ramp along the northern side, leading into an atrium, quadrangular in plan, and a vault partially lit by a skylight. From the atrium, we enter the Basilica, a rectangular hall divided into three naves covered by barrel vaults of equal height, separated by two lines of three rectangular pillars each. The wider central nave is distinguished by having an apse to the east and by the wall bordering on the *Vestibulum*, where a window is cut over the entrance: this window was the only entry for external light. Comparable to the complexity of the plan layout are the elaborate decorations: there is a black-and-white mosaic floor and, on the walls and vaults, alternating polychrome frescoes and stucco figures. The three-nave hall is dominated by the white colour of the stuccos: the two main figures, representing Sappho throwing herself from the Rock of Leukas and the

kidnapping of Ganymede, are situated in the hemispherical vault of the apse and in the central square of the middle vault (Plate VIII: Fig. 2). On the other surfaces, above a skirting board painted red, moulded frames delineate panels containing a wide variety of representations of classical myths, mystic rituals and scenes of everyday life. In the complex decorations, there are also many representations of female worshippers offering up prayers, as well as objects like vases, candelabra, musical instruments, and tables, clearly having a symbolic meaning. On the side-walls, large panels portray stylized landscapes. In the Vestibule, the decoration is enriched by being in many colours, both on the vault, again divided into square paintings, and on the walls, where painted landscapes depict lively birds and flower garlands. The elegance and stylistic uniformity of the decorations make the Basilica an exceptional masterpiece, securely dated to the first decades of the first Century AD. The discovery of this incomparable building immediately engendered great excitement and interest. Many different interpretations were suggested by scholars as to its intended purpose, but they can basically be divided in two hypotheses: it was a funerary monument or it was the sacred place of a mystery cult. The best analysis was performed by J. Carcopino (1944), who identified the Basilica as a place of worship for the neo-Pythagorean cult. The architecture completely follows the rules of this doctrine, both in its plan and in its decoration. The long access corridor, oriented north-south, prepared initiates for meditation and concentration before entering the Vestibule and participating in sacred rites in the Hall, the

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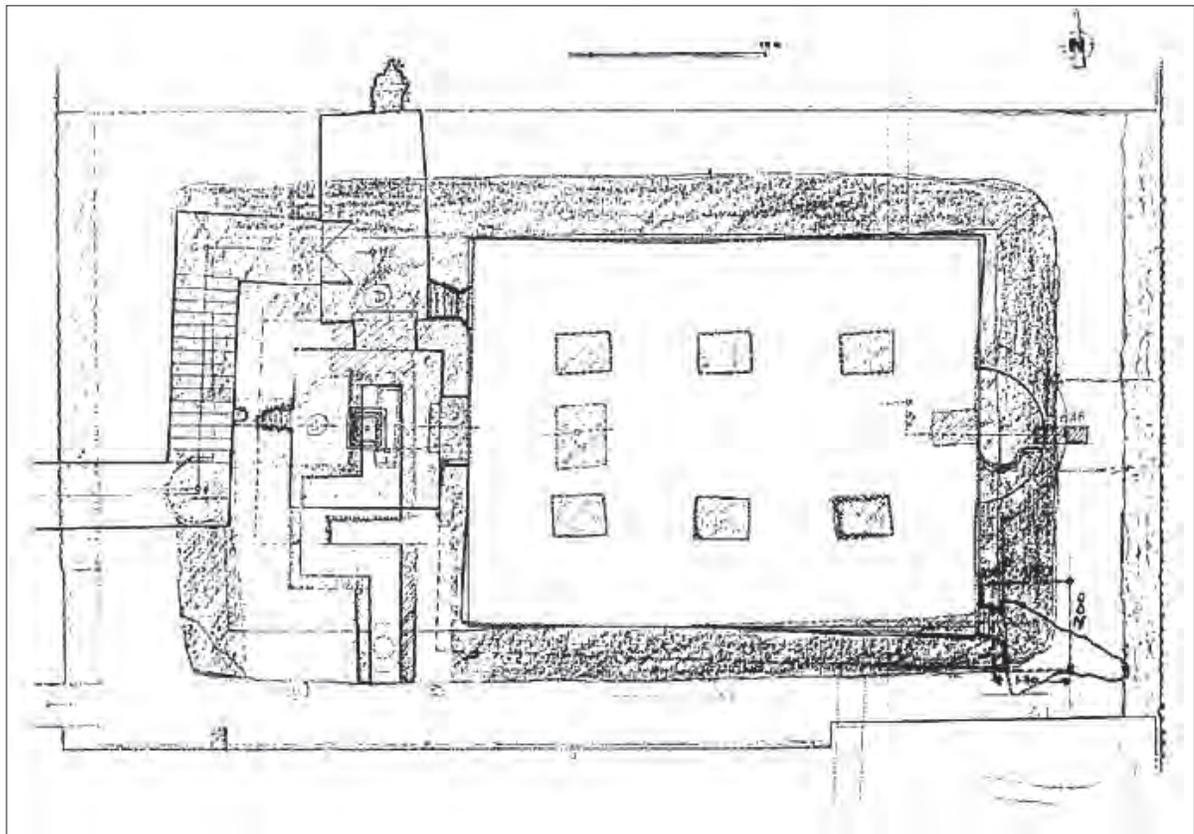


Fig. 1. Plan of the Basilica.

actual core of the temple. The decoration of the central nave emphasizes the colour white, which symbolized the purity of the soul, which was necessary in order to make contact with the divine world. On the vaults, figures create an ideal world where life is directed towards the celestial sphere, while the subject represented in the hemispherical vault of the apse – the focal point for the ceremony – clearly depicts the salvation of the soul after death, something that was only available to the initiates.

### Geometrical Study

The analysis is based on the assumption that in the design of the Basilica numerical criteria, and mainly the Triads of Integers, were used to obtain the chosen proportions and to achieve the squarings (Ranieri 1997). Trial-and-error CAD work, at first on the major segment (in yellow in Plate VIII: Fig. 3), has shown that it is best-interpreted as a rectangle with sides in the ratio 4:3, which is the proportional ratio of the Pythagorean triad **D = 3-4-5**.

The second phase of the analysis included all the other most significant geometrical elements (i.e., the shape of the vestibule, the position and shape of the pillars, and the semicircular segment at the apse) following

the methodology employed in other cases (such as the Etruscan temple of Marzabotto, Ranieri 2005).

The result is the consistent scheme shown in Plate VIII: Fig. 3.

It describes the Basilica in terms of:

Precise (Pythagorean)

**D= 3-4-5** (x17) for the main rectangle.

Precise (Pythagorean)

**V= 20-21-29** for the vestibule

Quasi-precise

**Q= 12-12-17** (deviation from 90° = 11') Circle-Square-Circle scheme

**CQC with Q = 17-17-24** (deviation from 90° = 11') for the apse.

This interpretation implies a length unit  $v = 4/22.99 = 0.17399 \text{ m} = 0.3478/2$ , i.e. one half of the Greek common foot (0.3476 m).

The axis of symmetry of this geometrical scheme, represented in the figure, was considered the best approximation to the true Basilica axis: we stress that this axis joins the centre of the apse to the centre of the hollow where the altar stood.

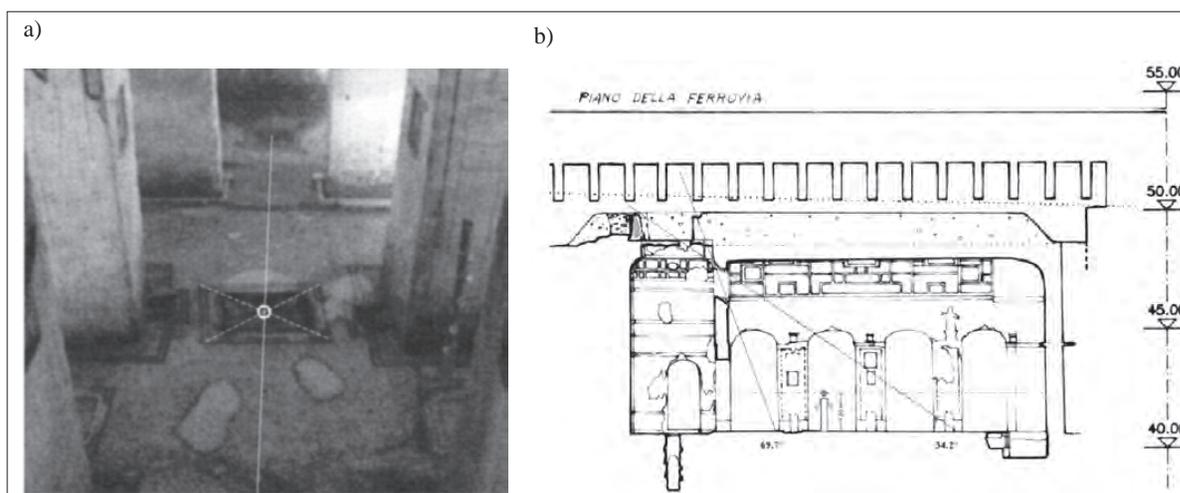


Fig. 4. a) The axis of the Basilica superimposed upon a picture of the floor; b) A vertical section showing the field of view of the window.

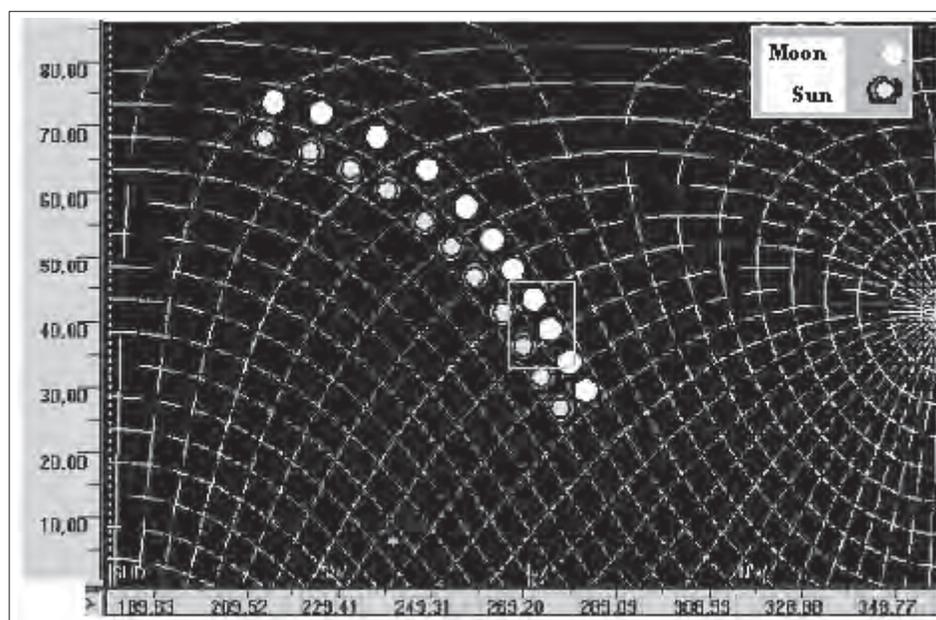


Fig. 5. The path of the Sun at Summer Solstice and of the Moon during the Major Lunistic. The rectangle represents the field of view of the window.

### Astronomical Orientations

The Basilica thus shows a definite axis, determined by the centre of the altar hollow and by the geometrical centre of the apse: the centre of the window also lies on the axis. It is therefore the orientation of this axis (Fig. 4a) that should be determined first.

It was no easy matter to make this measurement. The view from the window is presently obscured by engineering work connected with the overlying railway line and by a reinforced concrete slab built during the 1950s in order to preserve the underground structure from mechanical stress and infiltrations of water. Measurements by compass or GPS were both rendered impossible by the overlying railway line. Instead, we

laterally shifted the axis of the Basilica to the outside by using laser beams. The orientation of the axis was then determined with respect to a meridian orientation that we had already established by observing the meridian transit of the Sun. The azimuth value obtained was  $271.0^{\circ} \pm 1.5^{\circ}$ . In some ways, it is surprising that such an accurate E-W orientation could have been obtained in an underground structure with the technology available in the 1st Century. The field of view of the window was then measured both in elevation and azimuth by using a theodolite. The values obtained range from  $266^{\circ}.6 \pm 0^{\circ}.9$  to  $280^{\circ}.0 \pm 0^{\circ}.7$  in azimuth and from  $34.2^{\circ} \pm 0.2^{\circ}$  to  $69.7^{\circ} \pm 0.1^{\circ}$  in elevation (Fig. 4 b).

As a result of the geometry and the axial orientation, direct sunlight can only penetrate inside the Basilica

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for a very short time, and on just a few days around the summer solstice. For instance, on the Summer Solstice in 12 AD, sunlight entered the Basilica from 15:56 to 16:28 Local Time. On the other hand, the Moon at this epoch, when near to the major lunistic, passed diagonally across the field of view of the window.

We should take into account that, before and after the transit through the window of the Sun or Moon, sufficiently strong diffuse light from the sky could have created some visibility, even though the environment was in semi-darkness. However, a unique light effect is present inside the Basilica: the shape of the window – a rectangle with rounded ends – becomes a perfect circle corresponding to the altar's position, at a height of 60 cm above ground level. Thus, a reflecting surface (such as a water basin) upon the altar would have projected, by diffuse sky light, a perfectly circular spot on the ceiling of the room: we verified that this spot coincides exactly with the stucco representing the "Kidnapping of Ganymede" at the centre of the nave. This effect is fairly clearly visible when the window is illuminated with a 500 W lamp, which roughly corresponding to the diffuse sky light present when the Sun is 30° above the horizon (Fig. 5).

Of course, many other celestial bodies crossed the window during the night. However, no very bright stars or impressive asterisms did this. The only asterism of interest to the builders of the Basilica might have been Lyra, since the corresponding musical instrument is represented many times in the stuccos.

## Conclusions

The interpretation of the Basilica as a place of worship is supported by the lack of archaeological evidence of any funerary use and by the possibility that the building was included in the estates owned by the Statilia family, and in particular T. Statilius Taurus, consul in 44 AD: he committed suicide in 53 AD because of a charge of magical practices. Actually, "mystery cults" – with peculiar and autonomous characteristics – were widespread in the Mediterranean area and in Rome at this time. They offered an alternative to the official religion, where the State authorities controlled all access to the patronizing gods. The new conception, in contrast, was based on the fascinating idea of a personal way to heaven: the subject becomes the individual who, by his personal vocation and choice, comes directly into touch with the divinity, waiting for salvation after death, irrespective of his social position. Individual piety often attracted people to the mystery cults, but an initiation rite was mandatory (in Greek,

*mystes* means 'initiated') in order to be accepted among the followers of the god or divinity.

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## ROMOS PORTA MAGGIORE „NEOPITAGORIEČIŲ BAZILIKOS“ ARCHEOASTRONOMINĖ STUDIJA

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## Santrauka

Vadinamoji „Neopitagoriečių bazilika“ atsitiktinai buvo aptikta 1917 m. Porta Maggiore, Romoje. Ji yra vienas iš pačių garsiausių ir daugiausia aptartų požeminių Romos paveldo objektų. Nėra abejonės, kad šis paminklas buvo naudotas labai trumpą laiką, tik I a. pirmojoje pusėje, bet jo paskirtis ir šiandien tebėra neaiški, nors labiausiai tikėtina interpretacija, kad tai galėjo būti neopitagoriečių šventykla. Statinys susideda iš dviejų patalpų, pagrindinės salės ir prieangio, kuris prabangiai dekoruotas gražiais lipdiniais. Pagrindinės salės langas ir anga prieangio stoge yra išdėstyti pagrindinėje pastato ašyje ir, atrodo, galėjo būti naudojami dangui stebėti.

Dėl pastato geometrijos ir jo orientavimo tiesioginiai Saulės spinduliai labai trumpą laiko tarpą prasiskverbė į bazilikos vidų, tai trukdavo tik kelias dienas, vidurvasarį saulėgrįžos metu. Pavyzdžiui, 12 m. e. metais vasaros saulėgrįžos dieną tiesioginė Saulės šviesa į baziliką pateko nuo 15.56 iki 16.28 val. vietos laiku. Kita vertus, Mėnuliui esant netoli didžiosios lunisticijos, jo šviesa kirto lango regėjimo lauką įstrižai. Be

to, turėtina omenyje, kad prieš trumpalaikį Saulės ar Mėnulio pasirodymą ir po to per langą krisdama pakankamai smarkiai išsklaidyta dangaus šviesa galėjo sudaryti sąlygas šiokiam tokiam matomumui, nors visa aplinka ir skendėjo prieblandoje. Tačiau ypatingas šviesos efektas pasireiškė pačios bazilikos viduje: keturkampio užapvalintais kampais lango projektuojama išsklaidytos dangaus šviesos dėmė, krisdama į buvusio altoriaus vietą – 60 cm virš grindų lygio, virsdavo idealiai apvalia. Taigi ji galėjo atsispindėti nuo ant altoriaus esančio atspindinčio paviršiaus (pvz., nuo vandens pripildyto indo) ir skleisti šviesos skritulį ant patalpos lubų.

Mes nustatėme, kad atspindėta šviesos dėmė projektavosi tiksliai ant centrinės navos lipdinio „Ganimedo pagrobimas“. Šis efektas buvo pakankamai gerai matomas, langą apšvietus 500 W lempos šviesa apytiksliai atitinkančia išsklaidytą dangaus šviesą, kai Saulė būna pakilusi virš horizonto 30°. Šie pastebėjimai nurodo į galimai ritualinę pastato paskirtį. Nuomonę, jog ši bazilika galėjo būti naudojama ritualinei paskirčiai, netiesiogiai palaiko ir tai, kad joje nėra rasta jokios archeologinės medžiagos, liudijančios jos, kaip laidojimo vietos, paskirtį, kaip ir tai, kad šis statinys galėjo būti dalis Statilia šeimos dvaro ir konkrečiai galėjo priklausyti konsului T. Statilius Taurus (konsulas nuo 44 m. e. m.), kuris nusižudė 53 m. e. m. apkaltintas praktišką magiją. Iš tikrųjų keistos ir savitos misterijos tuo metu buvo plačiai paplitusios Viduržemio jūros šalyse ir Romoje.

Vertė Jonas Vaiškūnas, Audronė Bliujienė

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