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## Basilicas with T-shaped Piers

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## Abstract.

The significance of this study emerged during work on the dissertation topic "Basilicas with Cruciform Piers: Structure and Proportions." Typologically, the Tshaped pier in horizontal section is the closest to the cruciform pier. Insights gained from the proportional analysis of early Christian Georgian basilicas - specifically those of Dzveli Shuamta, Vazisubani, Gurjaani, and Khirsa - necessitated a reassessment of the chronology of these monuments. T-shaped piers are found in several Georgian and Armenian basilicas from the Late Antique and early medieval periods. Thus, in general, T-shaped piers are a distinctive feature of early Christian basilicas in Transcaucasia. This article examines the comparison between Georgian basilicas with cruciform and T-shaped piers, their chronology, and the relationship between Georgian and Armenian T-shaped-pier basilicas. This research PHDF-23-051 has been supported by Shota Rustaveli National Science Foundation of Georgia (SRNSFG).

**Keywords:** Basilica; Dating; Early Christian; Past-ophorion; Proportion.

### Introduction

While working on the dissertation topic "Basilicas with Cruciform Piers: Structure and Proportions," the need arose to study the following issues: a) the chronology of Georgian basilicas with T-shaped piers; b) the relationship between Georgian basilicas with T-shaped and cruciform piers; c) the relationship between Georgian and Armenian basilicas with T-shaped piers.

The study focuses on the following basilicas with T-shaped piers in Kakheti: Khirsa, Vazisubani, Gurjaani's Kvelatsminda, and Dzveli Shuamta. First, we present the results of their proportional analysis. Methodologically, this analysis is based on the ten principles proposed by M.A. Cohen, which affirm that the existence of

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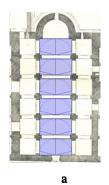
proportional systems in historical architecture is both a historical fact and a fundamental design method [1]. The second part of the study examines the chronology and planning characteristics of these basilicas.

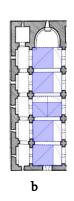
Since the structures of these monuments have undergone deformations, the recorded measurements were determined by considering the smallest and largest dimensions and calculating their arithmetic mean. The obtained results were then compared with the most frequently confirmed data. All measurements are given in centimeters. For illustrations, the plans of the following authors were used: G. Chubinashvili Fig 1- a,b,f, Fig 2-a,b,c,d,e,f; Fig 3 -c, Fig5-c,d,e,f; R. mefisashvili Fig. 1-d.; V.Tsintsadze -Fig4-f; V. Gagnidze Fig 1-c; R.Gverdtsiteli Fig 3-d; P. Zakaraia Fig 4-a,b; N. Bakhtadze-Fig 4-e; G. Kipiani -Fig4-a; T.Gabunia, G.Sosanidze -Fig.6-b.

During the research, the possible influence of Roman, Greek, or Persian measurement systems on the metrology of these monuments was considered. In all four basilicas, the transverse dimensions most closely correspond to units of the Roman measurement system [2], specifically the foot (29.6 cm) and the cubit (44.4 cm). For example, in the Vazisubani basilica: the width of the interior is 886-890 cm, the central nave - 440-447 cm, the side naves 132-134 cm, the piers 88-90 cm. These dimensions align with the Roman system as follows:  $30 \times 29.6 = 888 \times 29.6 = 888 \times 29.6 = 133.2 \times 29.6 = 88.8 \times 29.6 = 88.8 \times 29.6 = 88.8 \times 29.6 = 88.8 \times 29.6 \times 2$ 

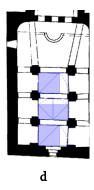
#### Main Part

In **Dzveli Shuamta**, the ratio of the central nave width to the total internal width is 1:2.5, while the ratio of the side naves to the total width is 1:5. In Vazisubani, the central nave width to total internal width ratio is 1:2. Additionally, in all four basilicas, the width of the piers is **one-tenth** of the internal width. However, dividing the external dimensions of the basilicas by the width of the piers does not yield whole numbers. These ratios clearly indicate that the dimensions were determined by dividing the internal width into equal parts. A similar proportional logic is evident in basilicas with cruciform piers. The ratio of pier width to total internal width is as follows: Bolnisi -1:18, Urbnisi - 1:18, Natkora - 1:10, Nunisi - 1:12, Nastakisi - 1:10, Zemo Alvani -1:12. Thus, identical methods of proportioning the plan and dimensions are evident in basilicas with both T-shaped and cruciform piers. Another important similarity should be noted: in basilicas with cruciform piers, the proportions of the rectangles formed by the pilasters of the piers in the middle nave follow distinct geometric relationships: **Bolnisi Sioni** - a paired dynamic square (Fig.1-a.]; **Urbnisi Sioni, Natkora** and **Nunisi** - a paired  $\sqrt{2}$  (which is the same as a  $\sqrt{2}$  rectangle) (Fig.1 -b,c,d.); **Zemo** Alvani - a paired dynamic square (Fig.1-f.); Nastakisi - a paired 3:2 rectangle (which is same as 3:4 rectangle) (Fig.1-e.).









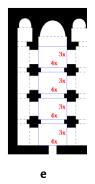
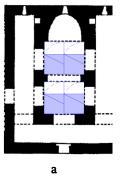


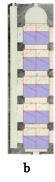


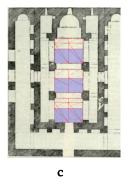
Fig.1.

A similar peculiarity can be observed in T-shaped-pier basilicas. According to K. Afanasyev [3], the cells of the central nave in **Dzveli Shuamta**, as well as the temple's outer contour, follow the proportions of the paired golden section—1.618:2  $\approx$  0.809 or 2:1.618  $\approx$  1.236. The ratio of whole numbers 4:5 provides approximately the same values (4:5 = 0.8 or 5:4 = 1.25). Our research results align with Afanasyev's findings (Fig. 2-a). Beyond Shuamta, the paired golden section is also observed in other basilicas: In the **Khirsa** basilica, the ratio of the central nave cell is 530:430 = 1.235 (Fig. 2-b). In the **Vazisubani** basilica, the central cell follows the ratio 445:360 = 1.236 (Fig. 2-c). The length-to-

width ratio of the pre-altar and extreme western cells of Vazisubani (445:385  $\approx$  1.153) closely corresponds to the paired  $\sqrt{3}$  proportion (2: $\sqrt{3} \approx$  1.154) (Fig. 2-c). This suggests that the peripheral cells are slightly wider than the middle cell, making them closer to a square.In **Gurjaani Kvelatsminda**, the middle cell of the middle nave follows the paired  $\sqrt{3}$  proportion (Fig. 2-e), while the eastern and western cells are slightly wider, making them even closer to a square (Fig. 2-e). This feature is particularly noteworthy, as it suggests the presence of a logical and consistent proportional system in the architectural design of these two basilicas.







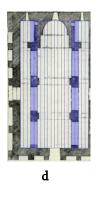






Fig 2.

At the same time, the total internal width and the widths of the piers in the Vazisubani and Gurjaani Kvelatsminda basilicas are identical (888 cm and 88-90 cm, respectively). In both basilicas, the width of the piers is related to the total internal width in a 1:10 ratio. In Vazisubani, the placement of the piers aligns with a grid obtained by dividing the interior width into 20 equal parts (Fig. 2-d). However, in Gurjaani, accurately aligning the piers and naves within a similar proportional scheme requires an additional refinement of the total width, which appears illogical. These proportional and dimensional relationships suggest that the compositional logic of the Gurjaani basilica evolved directly from the Vazisubani basilica. While it is possible that an architect in a later period could have built a temple using the same concept and dimensions, additional architectural similarities between these basilicas support the argument that they belong to the same period.

G. Chubinashvili dates **Gurjaani's Kvelatsminda** to the 8th–9th centuries, although he highlights several details that have parallels with 6th-century monuments [4]. S. Kakabadze proposed a dating at the turn of the 5th–6th centuries [5], a view that D. Tumanishvili disagreed with [6]. However, G. Kipiani's analysis challenges Tumanishvili's arguments. Kipiani considers the upper limit of construction to be the second half of the 6th century [7]. The reasoning of Kakabadze and Kipiani appears well-founded. Indeed, based on numerous architectural features—such as horseshoe arches, dome placement, stonework, and overall plan—the temple closely parallels 6th-century monuments.

The basilica of **Vazisubani** (dated to the second half of the 6th century by Chubinashvili [5]) features three naves and a three-sided corridor, which, although structurally an extension, is contemporary with the main building (Fig. 2-c). A decorative arcade runs along the northern, western, and southern outer walls of the three-naved section. The eastern ends of the corridor terminate in apses, while the central sections of the northern and southern corridor walls are open with triple arches. Other three-naved basilicas with three-sided corridors and decorative arcades include Akhshani and Areshi.

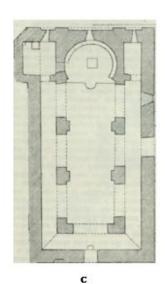
Gurjaani's Kvelatsminda also features a three-sided corridor, which, like Vazisubani, is completed by apses in the east (Fig. 2-f). The southern wall of the corridor originally had an open arcade, similar to that of Vazisubani (Fig. 2-c), as well as other three-church basilicas dating from the 6th–7th centuries [5]. Additionally, at the level of the corridor, the outer walls of the nave are flanked by a decorative arcade, resembling the one in Vazisubani. The overall character of the corridors in both basilicas is also quite similar

(Fig. 3-a: Vazisubani, Fig. 3-b: Gurjaani). The only significant distinction between the three-sided corridor of the Gurjaani basilica is its placement on the second floor, likely an adaptation to the steep terrain. The construction period of three-naved basilicas with additional galleries or rooms on the north-south axis and three-sided corridors generally falls within the 5th-6th centuries, which also aligns with the broader construction period of elongated three-naved basilicas along the east-west axis [8]. After the 7th century, basilicas became less common and were typically built with only one or two pairs of piers. Gurjaani's Kvelatsminda is a three-aisled basilica, divided into three naves by three pairs of piers, with the westernmost piers shaped like the  $\Gamma$  (Cyrillic "G"). This shape is a structural adaptation due to the second-floor three-sided corridor above the side naves, which influences the first level of the basilica. Without this upper corridor, the basilica would have been divided into three naves by just two pairs of piers, making it structurally similar to Vazisubani.



a





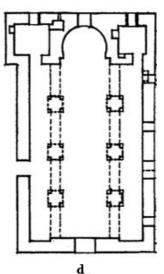


Fig. 3.

A distinctive feature of **Gurjaani's Kvelatsminda** is its northern pastophorion, which slightly projects beyond the overall width of the church, creating a

somewhat awkward protrusion on the northern façade (Fig. 3-c). A similar architectural feature can be observed in Anchiskhati Basilica in Tbilisi, dating to the

early 6th century (Fig. 3-d). Thus, in terms of functional spaces and spatial organization, the Gurjaani basilica shares significant parallels with 6<sup>th</sup> century basilicas. Based on multiple supporting arguments, it can be attributed to the 6th century. It is also possible that its design represents a direct development of the Vazisubani basilica. Another significant feature is the identical "isodomic" masonry found in both the Gurjaani and Vazisubani basilicas. Comparable masonry techniques appear only in 5th–6th century structures such as Cheremi and Ujarma. Additionally, both basilicas share a distinctive decorative motif of paired arches on their facades, further reinforcing their architectural and chronological connection.

It is important to examine the rooms located to the north and south of the sanctuary, known as **pastophorions**, and their chronology in Georgian basilicas. Pastophorions are present in almost all early Christian three-aisled basilicas of Kakheti, varying in their degree of isolation or openness. In Kartli, most basilicas include pastophorions, except for **Bolnisi Sioni**, **Sve**-

**titskhoveli, and Tsilkani**. Additionally, columned basilicas such as **Akaurta Sioni** and **Ivris Sioni** do not feature them. In Western Georgia, pastophorions are generally absent in basilicas, with the sole exception of **Nokalakevi II** [14].

Among Georgia's early Christian churches, several can be dated with relative certainty based on historical archaeological modern methods, epigraphic data: Samtavro (Fig. 4-a.) - Second quarter of the 4th century [9]; Dolochopi I (Fig. 4-b.) - Second quarter of the 4th century [10]; Chabukauri (Fig. 4-c.) – Second half of the 4th century [10]; Bolnisi Sioni (Fig. 4-d.) – Early 5th century [11]; Dolochopi Basilica (Fig. 4-e.) – Early 5th century [10]; Svetitskhoveli (Fig. 4-f.) - Third quarter of the 5th century [12]; Anchiskhati (Fig. 3-d.) - Early 6th century [13]. According to these data, the earliest basilica in Kartli—Samtavro—includes pastophorions. However, from the early 5th century until the end of the century, pastophorions are absent and only reappear at the beginning of the 6th century.

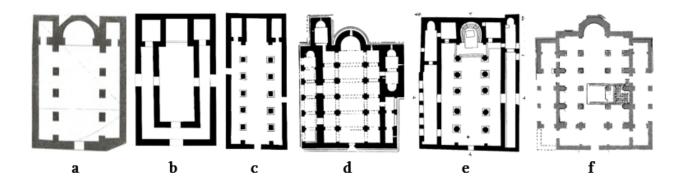


Fig 4.

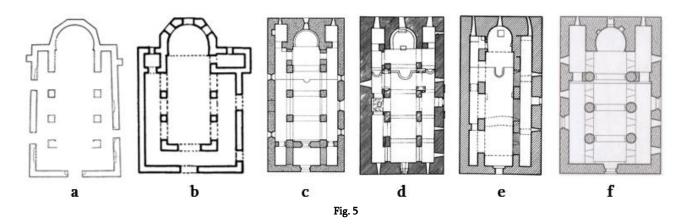
In all early three-nave basilicas of Kakheti, the altar is inscribed within a rectangle, causing the apse walls to form "gaps" with the longitudinal walls. However, among these, the most pronounced open character can be observed in the following basilicas: Khirsa (Fig. 6-a.), Telavi's Ghvtaeba (Fig. 5-c.), Katsareti (Khashmi) (Fig. 5-d.), Kondoli (Fig. 5-e.), Kurdgelauri (Fig. 5-f.),

Natkora (Fig. 1-c.). In contrast, the pastophorions in Areshi, Vazisubani, Kumi, and Gurjaani appear more structured. In Areshi, Vazisubani, and Kumi, this is due to lightening the apse walls, while in Gurjaani, it results from partially extending the northern wall (Fig. 3-c.). Additionally, while the pastophorions of the Dolochopi basilica appear isolated, the northern pastophorion is

connected to the side space, which is part of the northern gallery (Fig. 4-e.). This suggests that rather than serving as an isolated chamber, it likely functioned as a connector between spaces.

In the context of pastophorions, the second basilica of **Nokalakevi** (Fig. 5-b.), dating to the late 5th–early 6th century, is particularly noteworthy [14]. As previously mentioned, this basilica represents the only known example of pastophorions in Western Georgia, which indicates the difference in liturgical practice at this location in Western Georgia. Moreover, it suggests a similarity to the liturgical practices of Eastern Georgia, where pastophorions were more common. The first basilica of Nokalakevi (second half of the 5th century) features a protruding apse. Despite this, the

walls extending from the apse at the ends of the side naves create deliberate gaps with the longitudinal walls (Fig. 5-a.). This suggests that these gaps were intentional architectural elements, rather than structural inconsistencies. This suggests that Before the need for isolated pastophorions emerged, liturgical practice may have required a degree of visual separation within the sacred space, implying a passive function for these areas. However, by the early 6th century, a shift occurred, leading to the need for fully enclosed pastophorions. Since this transition likely reflects broader liturgical developments in Eastern Georgia, it is reasonable to hypothesize that the construction date of Kakheti's basilicas featuring similar "gaps" (including Khirsa) can be placed in the second half of the 5th century.



Our reasoning remains theoretical, but if it is correct, we can outline the following historical development: After the Christianization of Georgia (circa 326 AD), the liturgical practice that spread in Kartli and Kakheti necessitated the inclusion of pastophorions in basilicas. However, by the 5th century, their practical necessity may have diminished, although they still retained a passive function. This shift is reflected in Kakheti's basilicas, where the "gaps" between the altar and longitudinal walls may have served a similar role. In Kartli's basilicas, the easternmost cells of the side naves, visually framed by cross-shaped piers and pilasters protruding from the longitudinal walls, might have fulfilled an analogous

function. This can be observed in Bolnisi Sioni and Svetitskhoveli, both of which feature cruciform piers.

In addition to the pastophorions, the number of pier pairs in the above-mentioned basilicas with fixed dates is as follows: Samtavro – 3 pairs, Chabukauri – 5 pairs, Bolnisi Sioni – 5 pairs, Dolochopi – 5 pairs, Svetitskhoveli – 4 pairs, Anchiskhati – 3 pairs. This pattern suggests a gradual increase in the number of pier pairs towards the end of the 4th century, followed by a gradual decrease after the second half of the 5th century.

We have determined the second half of the 5th century as the likely construction period for the basilicas with "gaps" in Kakheti. The number of pier

pairs in these basilicas also aligns with this timeframe: Telavi Ghvtaeba – 4 pairs (Fig.5-c.), Katsareti Sameba – 4 pairs (Fig.5-d.), Khirsa – 4 pairs (Fig.6-a.), Kondoli – 3 pairs (Fig.5-e.), Kurdgelauri – 3 pairs (Fig.5-f.). Among these, the eastern pair of piers in Kondoli is positioned very close to the apse, suggesting an attempt to merge with the altar space. A similar approach is observed in the Dolochopi basilica, where the eastern piers are drawn closer to the altar (Fig.4-d.). This pattern is also

evident in the Samtavisi basilica [15], where three pier pairs are present, but the easternmost pair is distinctly shifted towards the apse (Fig.6-b.). A comparable trend can be observed when comparing the Rkoni and Vere basilicas from the 7th century [16]: In the Rkoni Basilica (early 7th century), there are 2 pier pairs forming 3 equal arches (Fig.6-c.). In the Vere Basilica (7th century), the easternmost piers are significantly shifted towards the altar (Fig.6-d.).

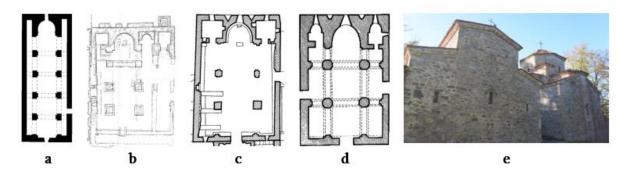


Fig. 6

Of course, the number of pier pairs alone cannot be used as an absolute criterion for dating basilicas - a four-pier basilica is not necessarily older than a threepier one. Exceptions must also be considered, such as columned basilicas (Akaurta, Ivris Sioni) and rock-cut basilicas (Uplistsikhe). However, the general trend of a gradual reduction in the number of pier pairs from the 5th century until the early 7th century is clear. After the 7th century, basilicas with more than two pier pairs are virtually nonexistent, with only a few exceptions from the 10th-12th centuries (Otkhta, Parkhali, Zeda Tmogvi). In most cases, basilicas built after the 7th century contain only one pair of piers. Since the Anchiskhati Basilica (early 6th century) already features a developed three-pier plan, it is reasonable to assume that the reduction in the number of piers began in the last quarter of the 5th century. Furthermore, observations from Samtavisi Basilica suggest that by the second quarter of the 6th century, a two-pier composition had become the dominant architectural scheme.

In Khirsa, the limited functionality of the "gaps" (due to their narrowness) is particularly evident, and the basilica contains four pairs of piers. This suggests a construction date in the second half of the 5th century. The Vazisubani and Gurjaani Kvelatsminda basilicas, featuring fully developed pastophorions and a two-pier composition, are best dated between the second quarter and the end of the 6th century. Regarding Dzveli Shuamta, while it could exceptionally be assigned to the second half of the 5th century, its two-pier composition, particularly the  $\Gamma$ -shaped western pair, suggests a transition toward a single-pier composition. This indicates a later date, likely the end of the 6th century or the turn of the 6th-7th centuries. Supporting this later dating, the stone masonry, cornices, and window decorations in Dzveli Shuamta closely resemble those found in the tetraconch churches of the same ensemble, which are firmly dated to the first half of the 7th century (Fig. 6-e). Thus, Khirsa appears to be

the earliest Georgian basilica featuring T-shaped piers, marking an important architectural transition.

As discussed in the proportional research section, the internal width and its division method were likely the primary considerations in the design of basilicas. According to Chubinashvili's existing plan, the pier widths in Telavi Ghvtaeba and Katsareti (Khashmi) follow a proportional relationship with the entire internal width of 1:10—a pattern observed in all four basilicas with T-shaped piers. The interior width of Katsareti is approximately 10 meters, and the ratio of the side naves to the central nave is 1:2. The piers in Katsareti do not have pilasters on either side; instead, they are elongated rectangles. Similarly, the interior width of Khirsa is also around 10 meters, but the ratio of the side naves to the central nave is 1:3.7. This suggests that in Khirsa, rather than narrowing the side naves, the elongated rectangular piers were shifted north and south, adhering to the established 10-meter (approx. 23 cubits or 34 feet) internal width standard. This expansion of the central nave was a direct consequence of that shift. To enhance structural stability, pilasters emerged on the piers facing the central nave. However, in the side naves, pilasters were unnecessary—both structurally and visually—since these spaces essentially functioned as narrow corridors leading to the sanctuary's "gaps."

The early Christian T-shaped-pierred basilicas of Armenia, as identified in the available to us literature [17, 18], include **Kasagh**, **Ashtarak**, **Eghvard**, and **Agtsk**. Upon examining their plans, a distinctive feature becomes immediately apparent: In all four cases, pilasters protrude from the longitudinal walls of the basilicas. These pilasters sometimes align with the rhythm of the piers and sometimes do not. In Kasagh and Agtsk, the pilasters are connected to the piers by arches. In the Ashtarak (Tsiranavor) basilica, the vaults are now demolished, but it's evident that The piers were connected to the longitudinal walls by arches and These arches rested on brackets slightly protruding from the walls. Despite this, the longitudinal walls still

featured pilasters. By contrast, in Georgian basilicas, pilasters corresponding to piers are absent in all Kakhetian examples, including those with T-shaped piers. In fact, pilasters are generally found only in cruciform-pierred basilicas, such as: Bolnisi Sioni, Svetitskhoveli, Nunisi, Uplistsikhe, Vashlobi, Urbnisi. Other early Christian cruciform-pierred basilicas do not exhibit pilasters protruding from the walls.

## Conclusion

A similar logic in planning and the placement of pilasters can be observed in both Georgian cross-pierred and T-shaped-pierred basilicas. Based on the architectural evolution and structural changes, the chronology of T-shaped-pierred basilicas in Kakheti can be established in the following sequence: Khirsa – Vazisubani - Gurjaani's Kvelatsminda - Dzveli Shuamta.

The formation of the T-shaped pier in Khirsa appears to have been influenced by changes in the function of pastophorions, which were, in turn, driven by shifts in liturgical practices. At the time of its construction, pier structures with pilasters were already present in Kakheti, as seen in the cross-pierred basilica of Dolochopi. In side naves, which functioned primarily as corridors leading to the "gaps", structural reinforcement or visual division was no longer necessary. However, in Vazisubani and Gurjaani, although the pastophorions became more spacious and isolated, the side naves still retained their function as passageways. Notably, in Gurjaani's Kvelatsminda, despite the introduction of a three sided corridor on the second level, there are no additional supportive arches, indicating that the piers continued to retain their Tshaped horizontal section.

The emergence of T-shaped piers in Armenian basilicas seems unrelated to the visual separation of side naves, even in cases where they were relatively narrow. Thus, the use of the T-shaped pier in Georgian and Armenian basilicas appears to have stemmed from fundamentally different reasons and approaches.

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ანოტაცია. საკითხის შესწავლის აქტუალობა წარმოიშვა სადისერტაციო თემაზე "ჯვრულზურჯიანი ბაზილიკები, სტრუქტურა და პროპორციები" მუშაობისას (სხვა ბაზილიკებთან შედარებითი ანალიზის საჭიროებისას). ტიპოლოგიურად ჯვრულ ბურჯთან ყველაზე ახლოსაა T-სებრი ბურჯი. ძველი შუამთის, ვაზისუბნის, გურჯაანისა და ხირსას ბაზილიკების პროპორციული ანალიზის შედეგად გაჩენილმა მოსაზრებებმა წარმოშვა ამ ძეგლების ქრონოლოგიის საკითხებში გარკვევის საჭიროება. T-სებრი ბურჯი გვხვდება გვიანანტიკური/ადრე შუა საუკუნეების პერიოდის არაერთ ქართულ და სომხურ ბაზილიკაში. ამდენად, T-სებრი ბურჯები, ზოგადად, ამიერკავკასიის ადრექრისტიანული ბაზილიკებისთვის დამახა-სიათებელი თავისებურებაა. განხილულია ქართული ჯვრული და T-სებრი ბურჯიანი ბაზილიკების ურთიერთმიმართების, ქართული T-სებრი ბურჯიანი ბაზილიკების ურთიერთმიმართების. ავლევა PHDF-23-051 ჩატარდა შოთა რუსთაველის საქართველოს ეროვნული სამეცნიერო ფონდის ფინანსური მხარდაჭერით.

**საკვანბო სიტყვები:** ადრექრისტიანული; ბაზილიკა; დათარიღება; პასტოფორიუმი; პროპორცია.

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