

THE FAÇADE OF THE VAULTED ROOMS ALONG THE SO-CALLED *CARDO*- IN UMM QAYS (ANCIENT GADARA), AREA III: ARCHITECTURAL DESIGN AND RECONSTRUCTION

by

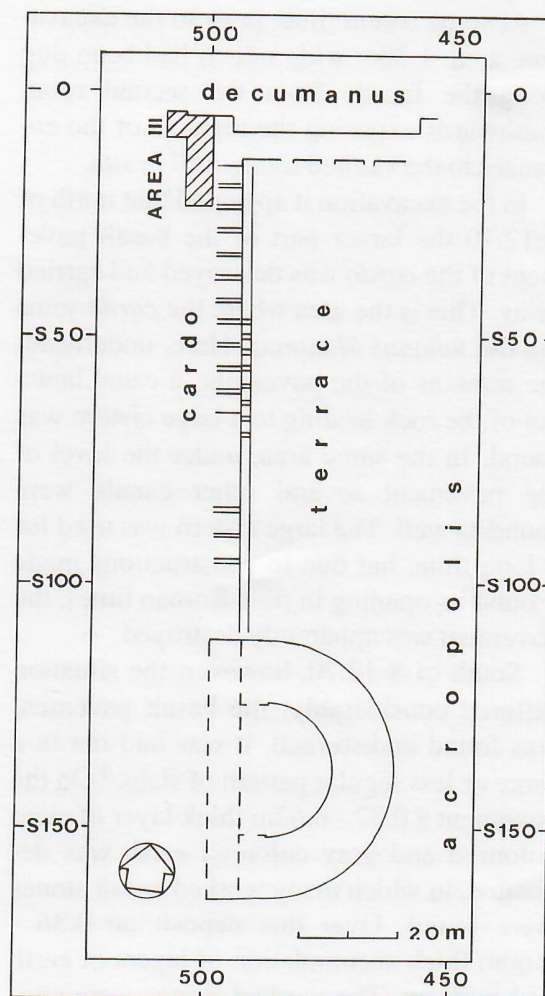
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The Site

The ruins near Umm Qays are identified with the ancient city of Gadara. Inside the walled city, which covers a site of approximately 1100 x 450 m, two areas may be discerned: an Acropolis hill (approximately 250 x 250 m) in the east, and a large Lower City in the west. The main street of the ancient city, *Decumanus Maximus*, runs east-west. At the north-west corner of the Acropolis the pavement of a north-south street (*cardo*) branches off from the *Decumanus Maximus* and runs along the western slope of the hill to the area in front of the Roman Theatre which is built on the hill side (Fig. 1). Between the Theatre and the *Decumanus* a large Terrace is situated at the bottom of the slope. A line of nineteen (possibly twenty) vaulted rooms were built against the Terrace's retaining wall which align the street's pavement.¹ The construction of the Terrace, the Theatre and the vaulted rooms is dated in the Roman period, tentatively at the end of the first or in the second century AD. In the following, only the Roman building phase will be referred to (the two churches and the columned courtyard that were built on the Terrace in Byzantine times will be mentioned, but not dealt with in depth).

The Excavation of Area III

The northern part of the street's pavement, labelled Area III, was excavated in 1977, 1979 and 1980 (Fig. 1).² In Area III



1. Umm Qays. Location of Area III.

four fields were investigated. Fields 1, 2 and 4 were each 5m wide and, together, they were 17m long, extending from the *Decumanus* corner to the area in front of the en-

1. U. Wagner-Lux, E.W. Krueger, K. and T. Vriezen, Bericht über Oberflächenforschung in Gadara (Umm Qes) in Jordanien im Jahre 1974, *ADAJ* 23 (1979): [31-39] 34; N.F. Mulder and R. Guinée, Survey of the Terrace and Western theatre area in

Umm Qais, *ARAM* 4 (1992): [387-393] 389.

2. U. Wagner-Lux and K.J.H. Vriezen, Preliminary Report of the Excavations in Gadara (Umm Qes) in Jordan, 1980, *ADAJ* 28 (1984): [87-90] 87-89.

trance to the third vaulted room (S 6.66 - S 23.34). Field 3 was a 4m wide extension to the west of field 1, aimed to uncover the western side of the *cardo*-street. The western boundary of the pavement, however, was not reached; therefore the width and the character of the so-called *cardo* could not be determined.³

At some recent time, prior to the excavation, a ca. 1.30m wide trench had been dug along the façade from the second room southwards exposing the remains of the entrances to the vaulted rooms still *in situ*.

In the excavation it appeared that north of S 12.70 the larger part of the basalt pavement of the *cardo* was destroyed and carried away. This is the area where the *cardo* joins the *Decumanus Maximus*. Here, underneath the remains of the pavement, a canal hewn out of the rock leading to a large cistern was found. In the same area, under the level of the pavement several other canals were found as well. The large cistern was used for a long time, but due to constructions made around its opening in post-Roman times, the pavement was apparently destroyed.

South of S 12.70, however, the situation differed considerably: the basalt pavement was found undisturbed. It was laid out in a more or less regular pattern of slabs.⁴ On the pavement a 0.52 - 0.62m thick layer of clear coloured and gray coloured earth was deposited, in which many worked basalt stones were found. Over this deposit an 0.36 - 0.60m thick accumulation of layers of earth had built up. The worked stones were situated directly on or only a few centimeters above the pavement. They were apparently the building stones of the façade of the vaulted rooms which had fallen westwards onto the street.

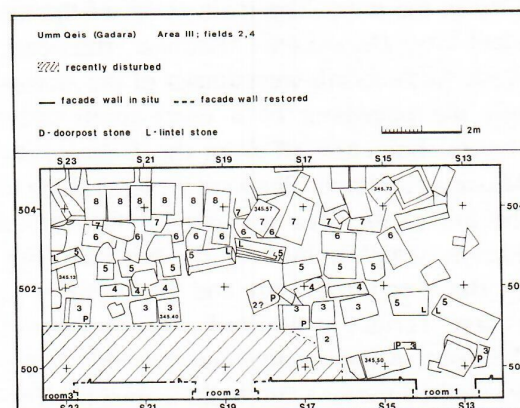
3. The question whether this pavement is part of a side street or of a monumental square may only be solved by continued excavation.

4. U. Wagner-Lux and K.J.H. Vriezen, *op.cit.* (n. 2), fig. 2, Pl. XIII,1 and XIV,1.

5. U. Wagner-Lux and K.J.H. Vriezen, A preliminary report on the excavations at Gadara (Umm

The Debris of the Façade of the Vaulted Rooms

In this way, to the south of S 12.70 a ca. 10m long section of the façade wall, lying toppled over in its original order, one course next to the other, was uncovered and excavated (Figs.2 and 3). The situation was comparable to the find of the collapsed west wall of the centralised church on the Terrace (Area I) a few years before.⁵ And like the demolition of that church building, the collapse of the façade of the vaulted rooms along the *cardo* was apparently caused by an earthquake, and dated by ceramic finds to the Omayyad period. (presumably the earth-



2. Debris of the façade of the vaulted rooms (Area III, fields 2 and 4).



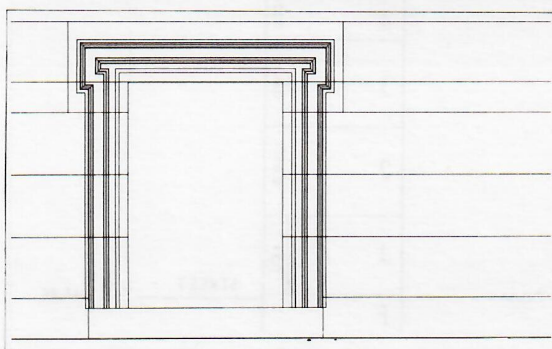
3. Debris of the façade during excavation (looking W).

Qes) in Jordan from 1976 to 1979, ADAJ 24 (1980): [157-160] 157; U. Wagner-Lux and K.J.H. Vriezen, Vorläufiger Bericht über die Ausgrabungen in Gadara (Umm Qes) in Jordanien in den Jahren 1976-1978, ZDPV 96 (1980): [48-58] 52f., Abb.3.

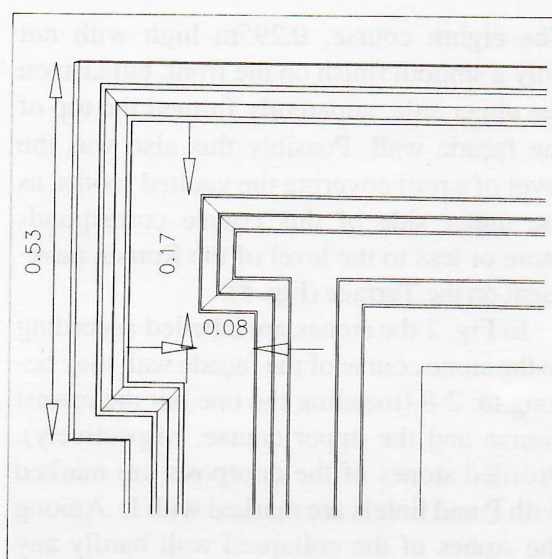
quake of 749).⁶

Figure 2 shows the section of the collapsed façade wall as uncovered in fields 2 and 4. The plan reveals remains of the three northern door frames and stone courses of the wall in between as they were found lying on the pavement. Not all the stones of the collapsed wall were preserved. In particular, the recent trench digging had caused a serious disturbance carrying away many stones that must have fallen just in front of the façade. However, enough data was available to make a reconstruction of the wall as, in addition to the debris, parts of the wall were still *in situ* up to two stone courses high, as were also both doorposts of the entrance to room I and the southern doorpost of room III. To the south of Area III the trench recently dug had exposed more parts of the façade still standing one or two courses high.

According to this data the door frames are made up of five courses of stones, in which a profile was cut (Figs. 4 - 7). The doorposts, which are set upon a threshold,⁷ are made of four courses, their height being ca. 0.70m, 0.61m, 0.61m and 0.30m from the lower to the upper. One long stone, 0.58m high, placed horizontally makes the lintel (the fifth course). In the façade wall between the door frames, the stone course level with the lower course of the doorpost is only 0.57m high, underneath which a foundation course (F)



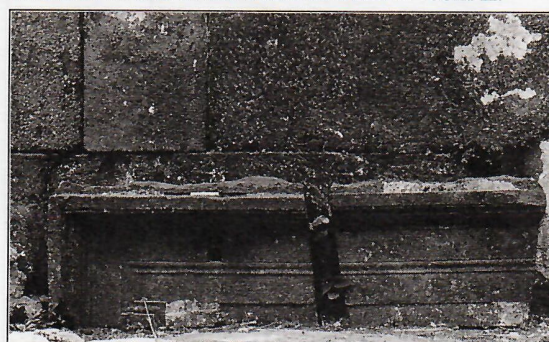
4. Reconstruction of the door frame of the vaulted rooms (applies for rooms I, IV and X-XX).



5. Reconstruction of part of the door frame.



6. Lintel of one of the doors in front of room II.



7. Detail of one of the door lintels on the Terrace.

becomes visible. Continuing upwards over the lintel a 0.58m high stone course is laid (the sixth course), on which a 0.29m high course forming a horizontally profiled ledge on the façade is placed (the seventh course).

6. K.J.H. Vriezen, *The Centralised Church in Umm Qais (Ancient Gadara)*, *ARAM* 4 (1992): [371-386] 375.

7. During the excavation and the archaeological-architectural survey, thresholds were not seen in the entrances to rooms II-IX and XVIII-XX.

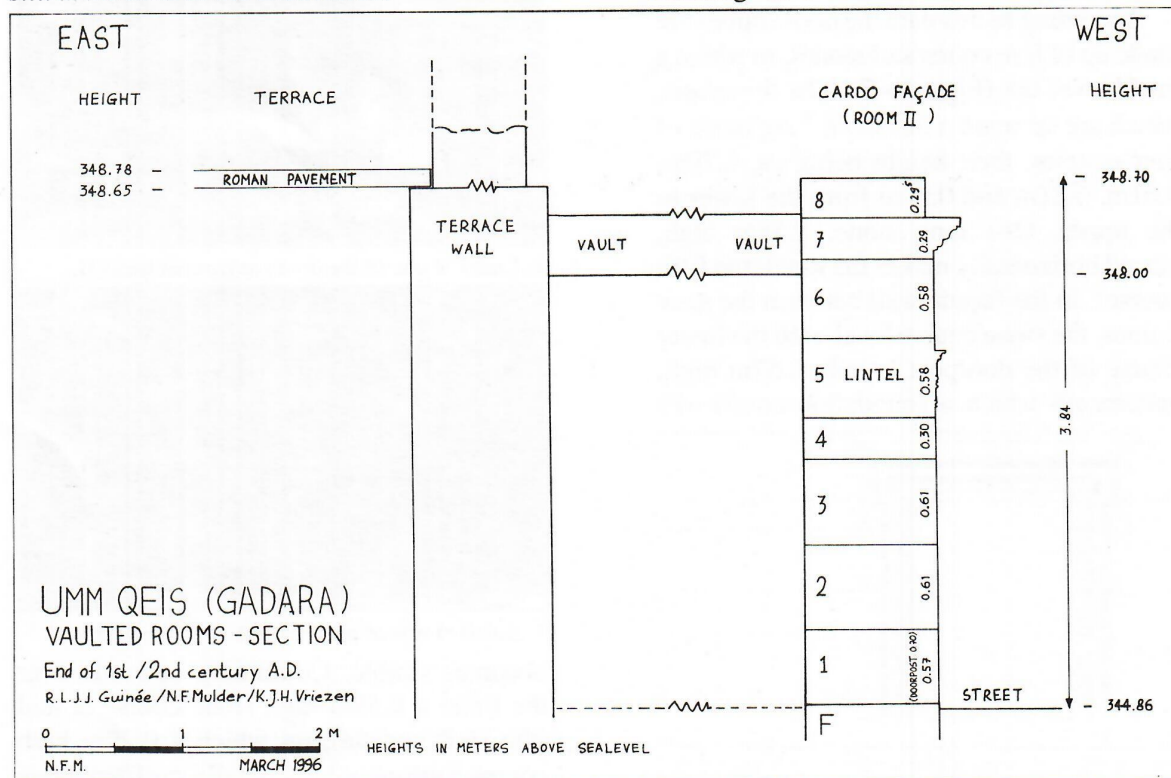
The eighth course, 0.295m high with not only a smooth finish on the front, but also on the upper side, apparently formed the top of the façade wall. Possibly this also was the level of a roof covering the vaulted rooms, as the upper side of this course corresponds more or less to the level of the Roman pavement on the Terrace (Fig. 8).

In Fig. 2 the stones are labelled according to the stone course of the façade wall they belong to: 2-8 (meaning the one but the lowest course and the upper course, respectively). Profiled stones of the doorposts are marked with P and lintels are marked with L. Among the stones of the collapsed wall hardly any stones of the lower two courses are represented. This is due to the recently dug trench and the fact that many stones of these lower courses were not collapsed, but were still *in situ* at the time of the excavation.

The Archaeological-Architectural Survey. Description of the Vaulted Rooms

In 1992 and 1993 an archaeological-architectural survey of the Terrace, Theatre and *Cardo* Quarter was made. The aim of this project was to set up a comprehensive documentation of the area and to present a reconstruction and interpretation of the buildings in their urban setting.⁸ During this survey, the remains of the vaulted rooms along the west side of the Terrace were also studied (Fig. 9). The vaulted rooms are numbered starting from the north from I to XX.

Eleven of the rooms are still covered with a barrel vault. Where the vaults have disappeared, traces of the countours of the vaults are still visible on the retaining wall of the Terrace. The remaining parts of the walls, vaults and façade which are still standing have been measured and drawn.⁹



8. Umm Qais (Gadara). Section of the vaulted rooms at the west of the Terrace.

8. N.F. Mulder and R. Guinée, Survey of the Terrace and Western Theatre area in Umm Qais, *ARAM* 4 (1992): 387-393.

9. During the survey, it was noted that sometime after

the excavations had finished, a part of the façade, between room III and room VI, had been restored up to a height of ca. 2m.

The inventurisation of the architectural elements, already started during the excavations of Area III, have been completed as far as possible.¹⁰ Furthermore the techniques of construction of walls and vaults have been studied, as well as the decoration and the design. According to this data it has been possible to reconstruct the architecture of these vaulted rooms with their façade.

Functionally, the vaulted rooms are the substructure of the platform of the Terrace,



9. The vaulted rooms at the west of the Terrace looking southward.



10. South corner of the façade of the vaulted rooms with rusticated stone blocks.

as they buttress the Terrace's retaining wall,¹¹ which makes up the rear walls of the rooms. The Terrace wall, up the dividing walls of the rooms and their façade were built by using the same technique and they bond with each other.

At the northern end, due to an inset in the wall, the façade of the vaulted rooms is distinguishable from the northwestern *anta* of the monumental entrance at the north side of the Terrace. The southern end of the façade is clearly marked with the use of rusticated stone blocks at the corner (Fig. 10).¹²

The walls of the Terrace and of the vaulted rooms, including the façade, were constructed by using basalt blocks in combination with *opus caementicium*. The facings of the walls were made of ashlar, the fill consists of a mass of rubble bonded with lime mortar, which also bonds the ashlar blocks to the supporting masonry of the core. As yet, no traces of plaster have been found. The barrel-vaults were built of white fine limestone blocks and rest upon the basalt dividing walls. The space in between the vaults is filled up with *opus caementicium* and so a flat roof has been achieved (Fig. 6).

Although the data suffice to reconstruct the façade, some questions still remain. One question is with regard to the position of the uppermost, the eighth, course. The blocks of this course were found as being the westernmost line of ashlar in the debris of the collapsed wall (Fig. 2:8). The height of the stoneblocks is about 0.295m, the length varies between 0.51 - 0.59 m, while the width of

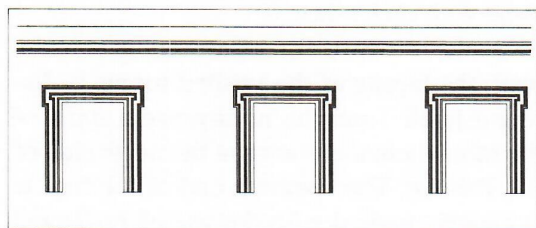
10. Many of the building stones, especially from the south part of the façade wall, may be preserved in front of the rooms. However, this area was not yet excavated at the moment of the survey.

11. For these kinds of substructures of terraces in Pella, Capitolias, Gerasa and Muwaqqâ, see R.H. Smith, Excavations at Pella of the Decapolis, 1979-1985, *National Geographic Research* (1985): [470-489] 478, fig.14; R.H. Smith and L.P. Day, *Pella of the Decapolis 2*, Sydney/Wooster 1989: 83; T. Weber, *Pella Decapolitana* (ADPV 18), Wiesbaden 1993: 21; C.J. Lenzen and E.A. Knauf, Beit Ras/Capitolias: A Pre-

liminary Evaluation of the Archaeological and Textual Evidence, *Syria* 64 (1987): [21-46] 31ff., fig.5-6; I. Browning, *Jerash and the Decapolis*, Amman/London 1982: 82, fig.26 and 122, fig. 58; R.E. Brünnow and A. v. Domaszewski, *Die Provincia Arabia II: Der äussere Limes und die Römerstrassen von el-Ma'ân bis Bosra*, Strassburg 1905: 183, fig.757.

12. Rustication is applied in many other buildings in the Decapolis, e.g. in Gerasa: in the Hippodrome, around the South Gate and in the South Theatre. See I. Browning, *op.cit.* n.11, figs. 47, 50, 63, 64.

all blocks is about 0.91m. The fact that, apart from the upper side, only one of the short sides is smoothly finished, indicates that this side was the front. The other short side of the blocks, the back, is only worked in the upper



11. Reconstruction of a part of the façade of the vaulted rooms.



12. Architectural ornamentation of the external Monumental Gate (to the west of the city).

zone (0.10m). Most probably the blocks were placed against the vaults and did not project from the façade, which is about 1.00m wide. This means that only the cornice, the seventh course, was projecting from the façade (about 0.20m), giving a visual contour (Fig. 8).

The façade is soberly ornamented. The doorframes are profiled and, above the doors, a cornice runs continuously along the entire façade (Fig. 11). No traces of decoration, like painting, were found. Special attention must be paid to the ornamentation of the entrances in which a lintel has been introduced (Figs. 4-6). An almost identical ornamentation, although in larger dimensions, may be found in the doors on the Terrace (Fig. 7). The nearest parallel for the ornamentation found in Umm Qays is in the Monumental Gate west of the ancient town (Fig. 12).¹³ A pre-Roman example of such a lintel may be seen in 'Irāq al-Amīr.¹⁴

Apart from the ornamentation, the following observation may be made regarding the façade. The reconstruction of the façade, as shown in Fig. 8, is made for room II and, in general, it is valid for all rooms. In the southern part of the street, however, the level of the pavement gradually gets lower, the thresholds and the foundation course project more and more from the street level as one goes south.

Another observation to be made is the fact that the average height of the stone courses slightly decreases higher up the wall.¹⁵ Although the façade is not that high, this may have simplified the tasks of lifting and bed-

13. For the Monumental Gate see also P.C. Bol, A. Hoffmann and Th. Weber, *Gadara in der Dekapolis*, Deutsche Ausgrabungen bei Umm Qais in Nordjordanien 1986 bis 1988. Vorbericht, *Arch. Anz.* (1990): [193-266], 216-239, Abb. 28 and 30.

14. J.-M. Dentzer *et al.*, 'Fouille de la Porte Monumentale à Iraq al-Amir. La campagne de 1978' *ADAJ* 26 (1982): [301-321], 307, fig.4.

15. The façade is constructed of stoneblocks of different lengths placed in courses of uniform heights.

The lowest three courses are of 'double' height, the fourth of 'single' height, the fifth and sixth course again of 'double' height, but less than the lower three courses, and the seventh and eighth course are of 'single' height. The heights vary for each stone course:

0.550-0.590m (course 1), 0.595-0.635m (course 2), 0.595-0.635m (course 3), 0.300-0.320m (course 4), 0.580-0.590m (course 5), 0.580-0.590m (course 6), 0.285-0.295m (course 7), 0.290-0.300m (course 8).

ding by putting lighter blocks in the upper parts of the construction.¹⁶ One should be aware of this practice, when using the heights of the stone courses to find the dimension of the standard used in the design of a particular building.

Measurements for a Reconstruction

The fact that a large part of the vaulted rooms are still quite well preserved, offers the opportunity to do some systematic research on the measurements of the elements of the building, as well as on measurements of the building as a whole. These investigations will contribute to the basis for the reconstruction of the demolished parts of the building and to the understanding of the problems concerning the theoretical design of the building.

In the study of the standard used for the construction of buildings, the method usually applied is first to divide the measurements (in meters) by a hypothetical standard, which in this case may be the Roman foot. The hypothetical dimension of the foot may be about 0.295m, as this value was found on many occasions, measuring the height of the stone courses, which amounts to 0.29-0.30m or 0.58-0.59m.¹⁷ Then, the round number nearest to the result of the division, is taken to be the plural of the standard. After dividing the measurements by this plural, the standard can be found.

The total height of the façade, from the lower stone course including the upper

course, was established at 3.84m, this is the absolute height at the entrance to room II (Fig. 8) and held to be the average height for the whole façade wall as well.

The total length of the façade, from the inset to the *rustica* corner is 97.42m. Based on the assumption that the height of the façade is 13 and the length 330 (Roman) feet, the applied standard must be between 0.2952m and 0.2954m.¹⁸

The separate elements of the substructure were also studied systematically. Where possible, the interior of the rooms was measured. The rooms are rectangular and similar, their width varies between 3.45m and 3.89m (average: 3.68m), and their length between 4.84m and 5.00m (average: 4.91m). The width of the walls between the rooms varies between 0.91 and 0.98m (average: 0.96m). The details of the façade were also measured. The distance between two door openings varies between 3.09m and 3.64m (average: 3.30m). For the measurements of the doors, see below.

On occasions, investigations for the standard applied may be hampered by several factors. It should be realised that not in every building a round plural of the standard is to be found. Deviations may be caused, when during construction the work was not executed accurately according to a theoretical design. Buildings may have suffered disasters such as earthquakes or may have been used as quarries, which caused stoneblocks to move among themselves. Furthermore,

16. Of course, the weight of the stoneblocks also depends on the dimensions of the width and length and on the specific weight of the building stone applied. For a good example of decreasing height see the peribolos of the Temple of Bel at Palmyra in: J.-P. Adam (ed.) *Roman building Materials and techniques*. London, 1994: 115, fig. 263.

17. Some remarks about this hypothetical standard are already made for the Western Theatre in Gadara: R. Guinée and N.F. Mulder, Umm Qeis. The Terrace, Western Theatre and Cardo Area in the Roman period: Architectural design integrated in the landscape: the design of the Western Theatre, in *SHAJ* VI, Amman: Department of Antiquities of

Jordan (forthcoming). The same average heights of 0.58-0.59 m for the stone layers were found by H. Kalayan at the South Gate in Gerasa. H. Kalayan, Restoration in Jerash [With observations about the related Monuments], *ADAJ* 22 (1977-8): [163-171], 163.

18. H. Kalayan found 0.2936 m for the in Gerasa applied (Roman) foot, H. Kalayan, *op.cit.* n. 17, 163; J. Dentzer-Feydy found a foot of about 0.292 m, cf. J. Dentzer-Feydy, Remarques sur la métrologie et le projet architectural de quelques monuments d'époque hellénistique et romaine en Transjordanie. Pp. 161-171, esp. 162 in *SHAJ* V, Amman: Department of Antiquities.

buildings often have survived only in part. This applies especially to the elevations, limiting the possibilities for verification.¹⁹ However, in studying the design scheme of a building, it is not necessary to know the exact standard that was used. More important are the relative proportions of the building's various dimensions.

In Search for the Design Scheme

In order to find out what theoretical design scheme formed the basis for the façade of the vaulted rooms, the door openings may be a good starting point. An experiment was conducted to investigate how the widths of the door openings were related to their heights. For this reason as many as possible door openings were measured. Where (parts of) both doorposts were still *in situ* the width has been established, which varies between 1.46m and 1.52m. The height of the door openings could only be established where the doorposts were preserved on the spot up to the fourth stone course, or where they could be reasonably completed by substituting the missing post stones by the aver-

age height of the stone course in question, as calculated elsewhere from the façade remains. The height of the door openings varies between 2.17m and 2.23m. In the following table the width and height of the door openings are shown, where they could be established (all having a threshold *in situ*).

In Table 1 it may be seen that in almost each case the ratio between width and height is about 1:1.50. The same ratio, 1:1.50 or 2:3, between the width and height of door openings, also occurs in other buildings in the area of the Decapolis (cf. the hippodrome of Gerasa²⁰). Yet, this does not mean that the Roman architects did use this particular proportional scheme for their design, but the figures indicate the framework within which these design schemes were developed. In this experiment only the proportions of door openings were studied, but this metrological analysis can also be executed for other elements of the vaulted rooms and their façade, as well as for the Terrace in its entirety.²¹

The use of particular proportions becomes plausible, when the proportions found in the

Table: 1.

DOOR OF ROOM	WIDTH (M)	HEIGHT (M)	RATIO (W:H)
IV	1.51	2.23	1:1.48
X	1.48	2.21	1:1.50
XI	[1.49]	2.17	1:1.45
XII	1.49	2.22	1:1.49
XIII	1.50	[2.21]	1:1.47
XV	1.52	[2.14]	1:1.41
XVI	[1.49]	[2.22]	1:1.49
[...] = reconstructed value, completed with average dimensions			

19. For these remarks see also R. Guinée and N.F. Mulder, *op.cit.*, n.17; J. Dentzer-Feydy, *op.cit.*, n.18, p.161.

20. A.A. Ostrasz, The Hippodrome of Gerasa: A Case of the Dichotomy of Art and Building Technology. Pp.183-192 esp.188 in *SHAJ V* (1995). Amman: Department of Antiquities.

21. This will even be possible for the architectural details, like the ornamentation of door frames, capitals, etc. Cf. J.Dentzer-Feydy, *op.cit.*, n.18, p.171; *idem*, Les chapiteaux corinthiens normaux de Syrie méridionale 1er partie, *Syria* 67 (1990): 633-663.

analyses of various elements of the building complex can be related to each other in one comprehensive design scheme. The vaulted rooms are part of the Terrace construction, which is evident by the bonding of walls and by the execution of ornamentation. Although the Roman building phase of the Terrace complex consists of separate elements, like the monumental entrance with the *antae* in the north along the *Decumanus Maximus*, the substructure with the vaulted rooms and the elevation on the Terrace, these elements are all part of one building: the Terrace. However, the existence of one comprehensive design scheme for the whole

complex may only be proved by continued metrological study.

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