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The South Theatre at Jarash

Introduction

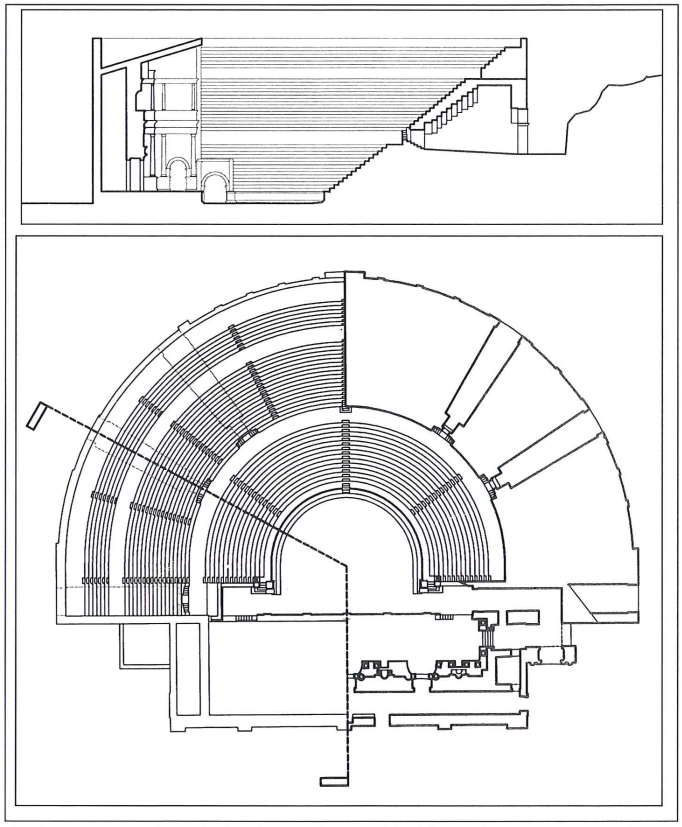
The South Theatre at Jarash was surveyed in 1994-6 by a team from the University of Melbourne as part of an ongoing study of Roman theatre architecture[1]. The findings of the 1994 campaign have already been published (Sear 1996: 217-230; Sear and Hutson 2000: 3-26). Some new information came to light in the 1997 campaign which supplements the information already published. This is discussed below. However the main achievement of the 1997 campaign was the documentation of the enormous quantity of well-preserved architectural material from the *scaenae frons* deposited behind the theatre. A calculation showed that there were about 4,000 blocks and it was anticipated that the work of cataloguing them would take two seasons. However most of the work was completed in the 1997 season. The method of cataloguing and identifying the blocks is described below.

The Plan and Section of the Theatre

A plan of the building was published in 1996, but the section has not been published (FIG. 1). The hillside flattens out a little above the level of the *praecinctio* with the result that the upper part of the cavea had to be supported on an *aggestus* or earth fill. The fill was contained by the heavy walls of the *analemmata.* It was further compartmentalised by four pairs of walls flanking the passageways into the *praecinctio*. These passages were roofed with rising vaults composed of a series of stone arches, which corresponded to the rows of seats above them (FIG. 2). A similar system was used in parts of the theatre at Leptis Magna (Caputo 1987: 9-11, 14-15). Without these passageways access to the parts of the cavea above the central *praecinctio* would have been extremely difficult.

The Missing Seats at the Top of the Cavea.

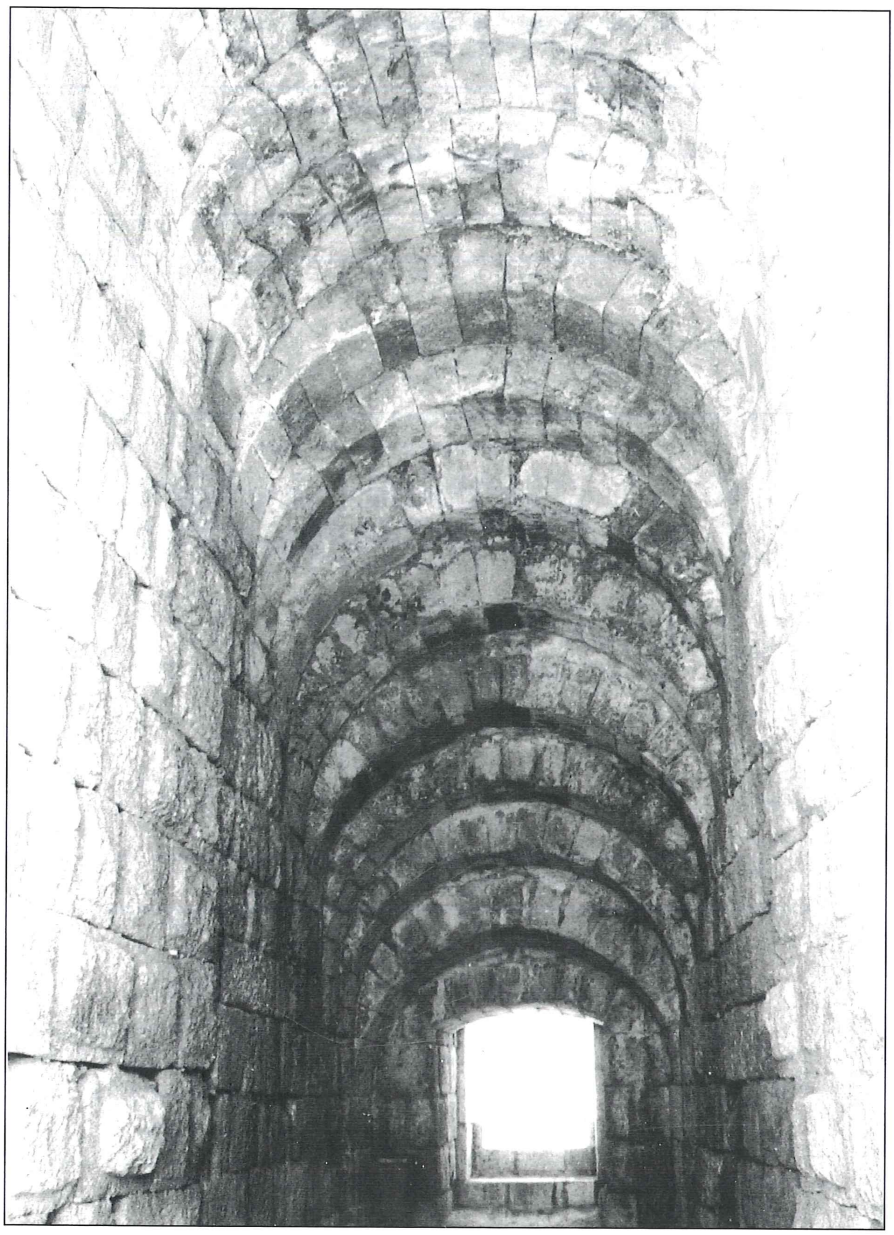
Of the upper part of the cavea 15 rows of seats survive, divided by staircases into 8 *cunei,* bringing the present overall height of the theatre, measured from the orchestra, to 16.28 metres. However there is room for many more rows of seats. The distance from the outer wall of the cavea to the edge of the rim of the top surviving seat is 7.80 metres. The seats near the top of the cavea are 46cms high x 76cms deep including the moulded rim which projects 10cms. Therefore they are 66cms wide from rim to rim.



1. Plan and section of the South theatre (A. Hutson).

There are two ways the seating could have continued. Firstly it could simply have continued higher without any

[1] The team that worked at Jarash included Barry Rowney, Chris Little, Shane Harvey, Scott Newman, Zig Kapelis. Maurice Smith and the authors. The survey was part of the Australian Roman Theatres project, funded by a grant from the Australian Research Council.



2. A vaulted passageway leading into the *praecinctio* at the top of the *ima cavea* (Photo F. Sear).

break, which means that the theatre had no *media cavea.* Therefore if there was a simple *praecinctio*, 1.05 metres wide like the lower *praecinctio*, and a balustrade, perhaps 80cms wide, at the top there would be space for a further 9 rows of seats. The width of the top row would be in addition to the width allowed for the *praecinctio*. This would bring the total number of rows in the *summa cavea* to 24, a large number in view of the fact that there were only 15 in the *ima cavea*. It would also bring the overall height of the cavea to 20.42 metres. In addition the height of the balustrade might add a further 1.20 metres.

There are some difficulties in assuming a *summa cavea* of this size, because it is disproportionately large compared with the *ima cavea.* Also it must be remembered that the upper rows of seats accommodated more spectators than the lowest rows because of the geometry of a Roman theatre. For example the upper 15 rows could seat 2,200 spectators, compared to the 1,250 in the lowest 15 rows. If a further 9 rows were assigned to the upper part of the *cavea*, making a total of 24 rows, there would have been seats for about 3,900 in the upper part of the cavea compared to 1,250 in the lower.

There is however the possibility that the top row of seats which survives represents the top row of the *media cavea* and that there was a *summa cavea* above that. If there was a *praecinctio* at this point, the same width as the lower *praecinctio,* 2.20m, and surrounded by a podium of similar height, and a *praecinctio* and balustrade at the top

of the cavea of the same dimensions as the ones given above there would be space for a *summa cavea* with a podium wall, 62.5cms wide, and 5 rows of seats. This is assuming seats 62.5cms deep, shallower than the seats of the *ima cavea* which are 66cms deep, excluding the projecting rim. The seats of the *summa cavea* were often somewhat shallower than those of the *media*, because it was normal for each section of the cavea to slope slightly more steeply than the one below it. At Bostra the seats are 59cms wide, 41.5cms high in the *ima cavea*; 55cms wide, 47.5cms high in the *media cavea;* and 50cms wide, 47.5cms high in the *summa cavea.* At Philadelphia the seats are 72.5cms wide, 42cms high in the *ima*; 69cms wide, 45cms high in the *media*; and 67cms wide, 45cms high in the *summa cavea.*

This division, into *ima, media* and *summa* cavea gives a better balance of seating. Allowing 50cms per seat there would be about 1250 places in the *ima cavea.* In fact this number of seats is confirmed by the numbers which appear on the seats of the outer *cunei* which are numbered, starting from the bottom row, from right to left, from A to COH. This gives a total of 278 seats in each of the four *cunei.* If the top row of seats with backs is added the total comes almost exactly to 1250. Therefore *ima cavea* with 15 rows would accommodate 1,250 spectators; the *media cavea* with 15 rows 2,200; and the *summa cavea* with 5 rows 1,250. The proposed division also fits the pattern of other theatres in the region. (TABLE 1) gives the seating arrangements in a number of Levantine theatres.

It will be noted that these theatres, all in the same region as Gerasa have three *maeniana* except Daphne, where the excavators restored an enormous *summa cavea* with 25 rows of seats (Wilber 1938: 567-94). There is no evidence for this and it is equally possible that it too had three *maeniana.* A cavea with three *maeniana* at Gerasa may also explain why the seating stops in the abrupt way it does. Old photographs show that the seating finished in a fairly clean line at the 15th row. If there was a separate *summa cavea* separated from the *media* with a podium wall, it would have been a somewhat fragile structure, prone to damage and easy to rob. On the whole therefore it seems likely that there were three *maeniana* at Gerasa. In that case, assuming a podium height of 1.50m the overall height of the cavea would have been 20.08m. In addition the height of the balustrade would add a further 1.20 metres. In terms of the overall reconstruction of the theatre there is very little difference in overall height between this method and the two *maeniana* design where the overall height is 20.42 metres.

TABLE 1. The seating division in Levantine theatres. The numbers refer to the rows of seats.

Theatre	Ima cavea	Media cavea	Summa cavea
Bostra	14	18	6
Caesarea	13	?13	?6
Cyrrhus	25	?14	?12
Daphne	17	?25	
Petra	11	23	10
Philadelphia	13	14	16
Samaria	14	10	?5
Scythopolis	13	14	?9
Sepphoris	12	12	10

Dating

There have never been any serious problems about the date of the theatre. The building is well documented epigraphically, a factor of great importance in the case of a building which has never been excavated stratigraphically and where no excavation is envisaged. The extensive epigraphic material means that the date of the South Theatre of Jarash can be established within close limits. An inscription dating to between AD 83-96 records that a *decurio,* T. Flavius, donated 3,000 drachmas to build a kerkis of the theatre (Jones 1928: 152-3). Another inscription, dating to AD 90, records the consecration of the theatron,[2] but the whole theatre was not complete at this time (Pouilloux 1977: 246-54; 1979: 276-8). A cylindrical stone basis found near the west end of the stage with a long inscription dating to between AD 102-114 suggests that the *scaena* is Trajanic (Jones 1928: 153-6).

The Reconstruction

The use of computers to aid in archaeological surveys and analyses has in the past been used mostly in the sorting of data. The integration of computer technologies into the fields of geomatics and architectural representation has led to the employment of these techniques into the parallel area of archaeological surveys. The incorporation of these technologies in our campaigns for the Roman Theatres Project has enhanced the survey of extant remains and provided greater opportunities for testing hypothetical reconstructions of the theatres being studied. The remains and surrounding fragments of the South Theatre at Jarash had specific characteristics that made the use of computer assisted techniques attractive for compressing survey times and enhancing accuracy. The articulation of the survey information for the South Theatre remains into a digital format also provided the opportunity to create three dimensional computer models integrating the various classes of architectural fragments that originated from the original theatre.

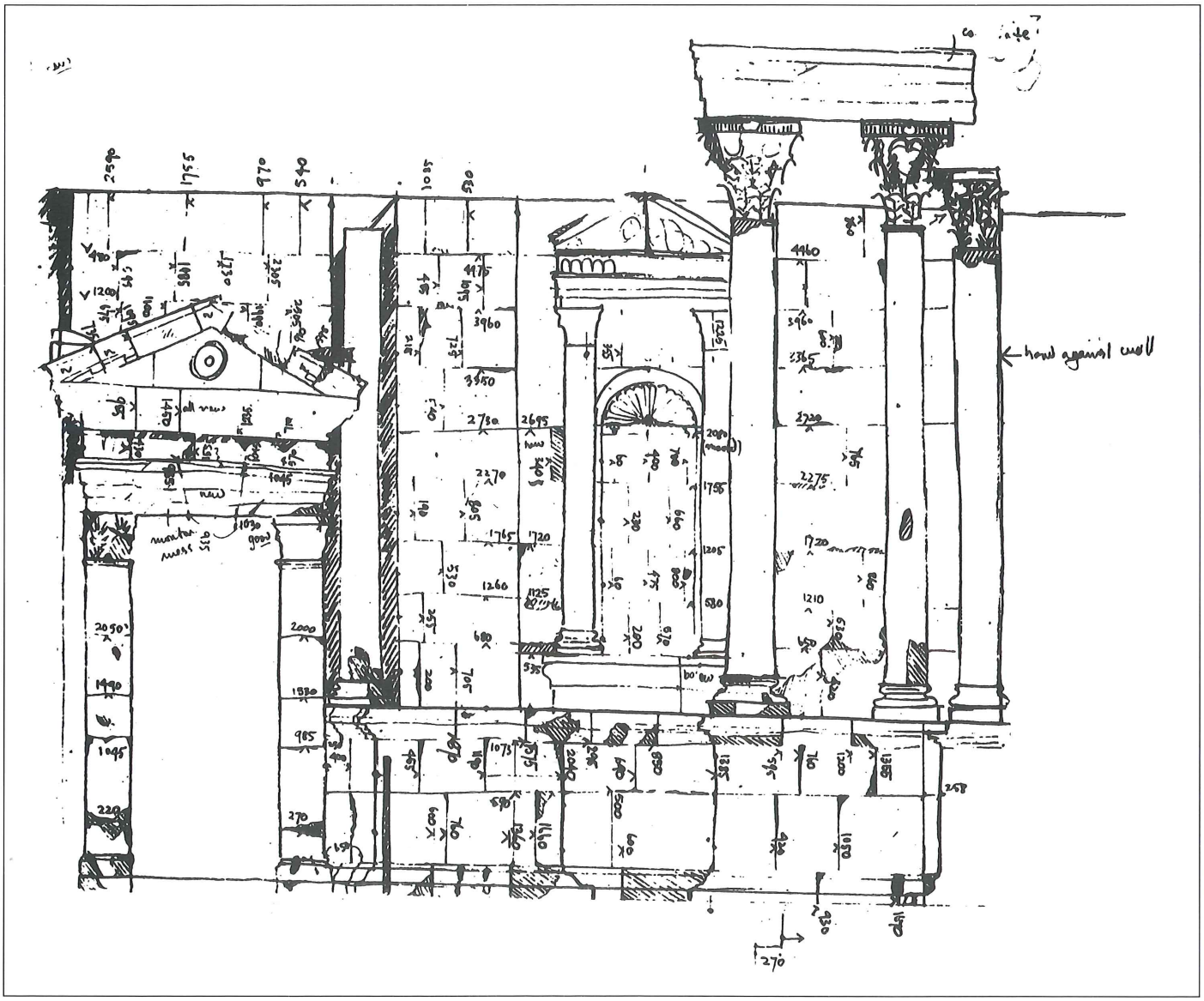
[2] By *theatron* I understand the place where the audience sat. See *CIL* X 833-5 from the Large Theatre at Pompeii where *theatrum* is distinguished from *crypta* and *tribunalia* and can only refer to the seating of the cavea.

The Survey of the Existing Conditions of the Theatre

An accurate survey of the South Theatre did not exist and early plans of the theatre showed glaring inconsistencies.[3] As previously discussed the significance of the South Theatre encouraged the need for a comprehensive survey and proposals for the original form of the theatre based on the standing remains and extensive surviving fragments.

The techniques used in the survey of the existing theatre at Jarash were developed on previous campaigns to other Roman Theatre sites undertaken by the team. The campaign teams for Jarash included archaeologists and architects working in concert to survey, document and analyze the remains. (FIG. 3) The survey techniques were developed to provide quick and accurate measurements of all aspects of the theatre while remaining simple and robust enough for those without previous experience to productively participate. This direct method allows for a degree of accuracy in triangulation that has previously not been possible with traditional drafting techniques.

The mix of digital and traditional drawn media to represent surveyed remains acknowledges the complimentary advantages of both. Our technique of transferring all survey information into the digital format while on site allowed for the team to check measurements against com-



3. Example of on-site hand drawing of architectural fragment (B. Rowney).

[3] For example Puchstein's plan of the theatre, published in 1914, shows six instead of four passageways under the *summa cavea*. E.R. Fiechter, *Die Baugeschichtliche Entwicklung des antiken Theaters* (Munich 1914) Fig. 95.

puter drawn plans. The enhanced accuracy in using triangulation also accommodated large irregular forms often found in theatre structures.

The Survey of the Fragments of the Scene Building

The survey of the standing and restored structure of the theatre was relatively straightforward. The real challenge was recording the location of and classifying the architectural fragments that had been excavated in 1925 and later removed from the theatre during the restorations of 1953-6 (Kirkbride 1960: 4-5). The fragments from the collapsed scene building were laid out in the fields outside the theatre where it is estimated there are over four thousand pieces (FIG. 4).

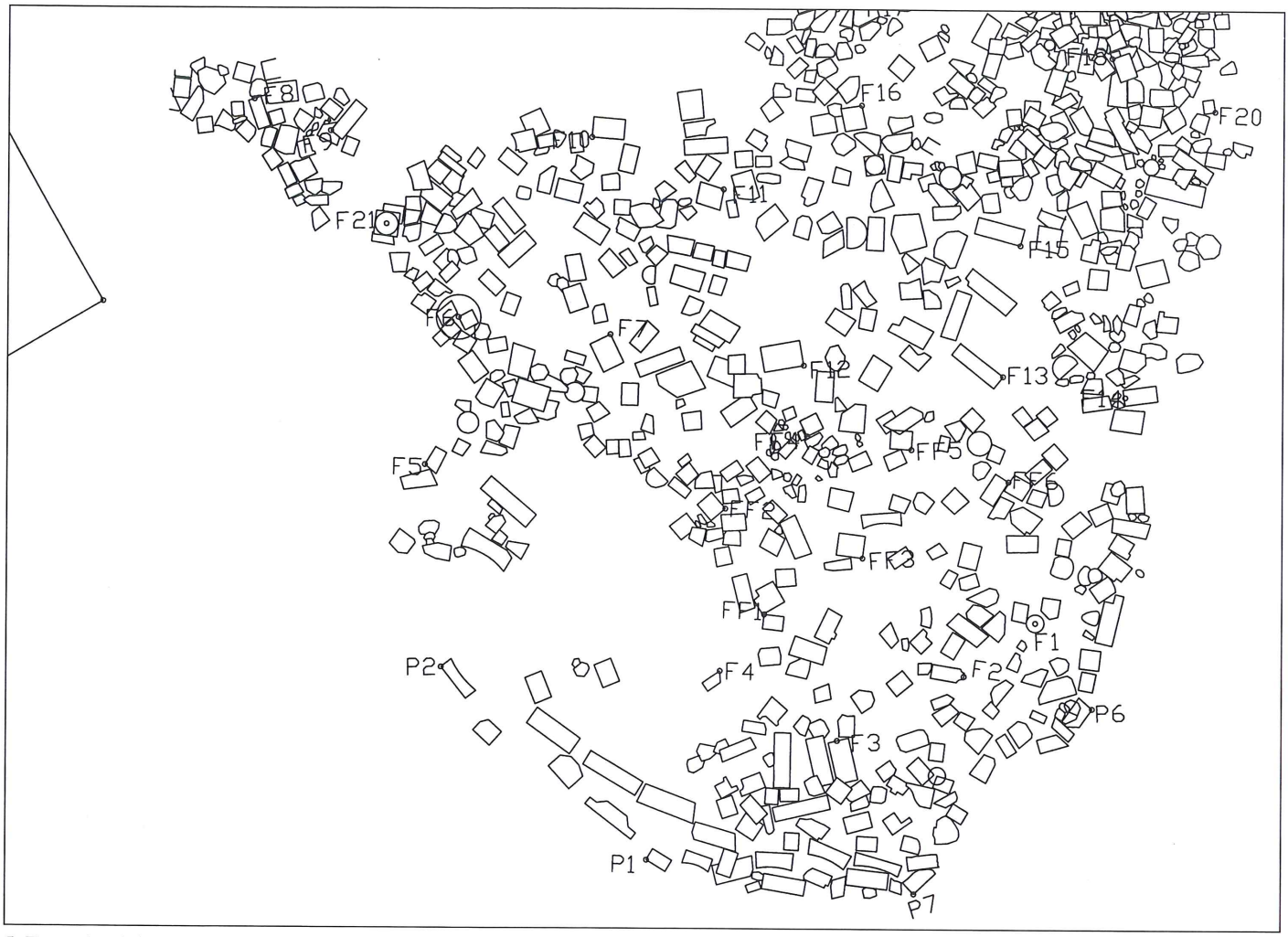
The method for locating and identifying the fragments was to designate selected fragments relative to the external wall of the theatre. The theatre dimensions were known through the previous survey by the team in 1996 and we were able, through the use of triangulation, to position the selected fragments on a plan. These designated fragments were evenly distributed throughout the entire field of fragments and were generally no more than four metres apart. The selected fragments were plotted onto a plan with computer documentation techniques that allowed for a high degree of accuracy. The selected fragments formed a framework between which the remaining fragments could be plotted. These were then added to the computer plan based on measurements taken in the field relative to the selected surveyed fragments (see FIG. 5 for typical layout plan of the fragments). The resultant plan located every piece and provided sufficient information to find each fragment when returning to the field.

The fragments were catalogued in accordance with their type: base, shaft, capital architrave, frieze, cornice, pediment etc. Each piece was given a number within the classes (for example F17 for a frieze piece) which was marked on the plan. These designations were entered into a spreadsheet that allowed for sorting the fragments according to size and type. This aided the identification of the fragments as belonging to various sections of the original *scaenae frons*.

The Computer Reconstruction of the Theatre

The use of computers to visualize buildings in three dimensions has been a feature of mainstream architecture since the early 1990s. In recent years the potential of this medium for the testing of hypothetical archaeological reconstructions is being realized. The benefit of having the measured data for the South Theatre and the surrounding fragments in the computer medium was that it became the

4. Blocks from the upper level of the *scaenae frons* behind the theatre (Photo F. Sear).



5. Example of site drawing of a portion of the field of fragments (A. Hutson).

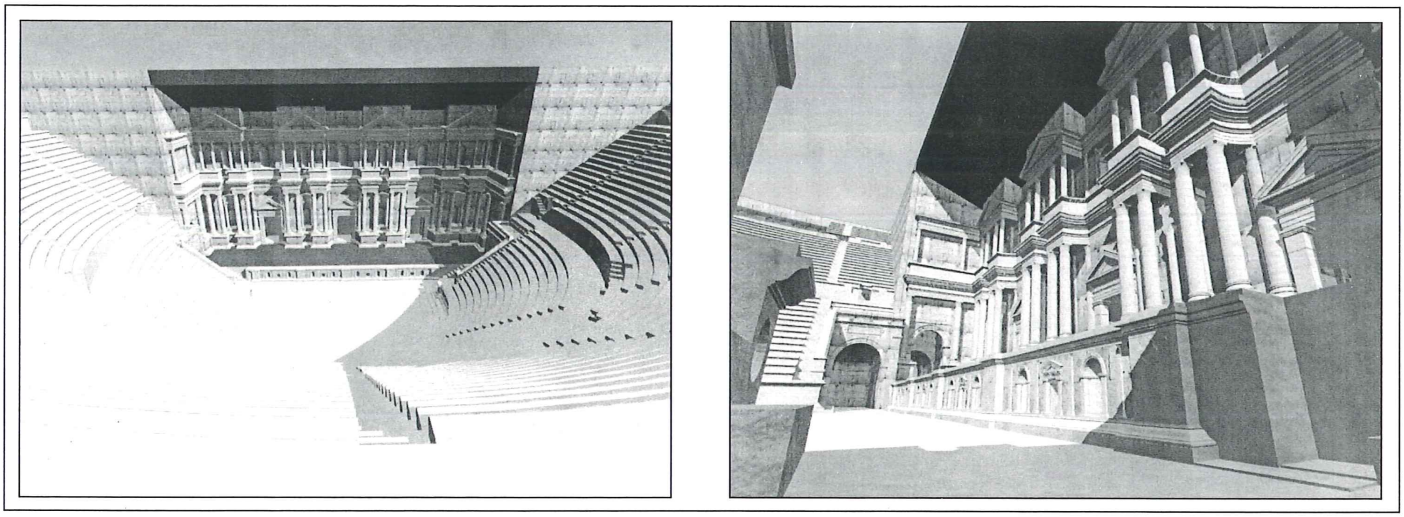
basis for a virtual reconstruction as a computer model. The extant remains of the theatre are transformed into a three-dimensional computer model that can be modified to test hypothetical reconstructions. The preferred model for the original theatre incorporated an additional 5 rows as previously discussed. The addition of a *summa cavea* with 5 rows would match the height of the stage roof atop the reconstructed *scaenae frons* based on the surveyed fragments (FIG. 6).

The Computer Reconstruction of the Scaenae Frons

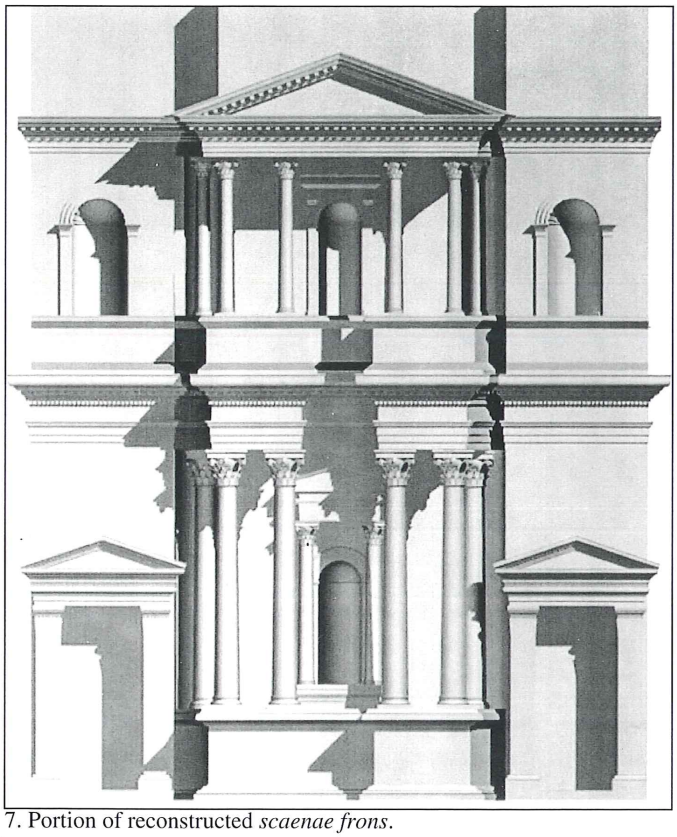
The catalogued the fragments from the scaenae frons were transformed into three-dimensional models with the computer and presented a breakdown of the range of individual components.[4] These digital components could be bought together as in a jig saw puzzle to form a reconstruction of the *scaenae frons*. (FIG. 7) The fragments, although placed within various categories of generic type (cornice) and sub-type (lower order, curved) still provided a range of dimensions. This range was often as great as 25% and was presumably accumulative. For example, if one presumed that it was intended for cornice lines to be horizontal then a range of column shaft lengths would require the modification of other element heights to achieve a consistent cornice line. The degree of consistency in the heights of similar elements may have been a consequence of the undulating and complex design of the *scaenae frons.* The numerous changes in direction of the line of the entablature required a degree of quality control that appeared beyond the masons while also providing the ideal profile to disguise any dimensional discrepancies.

The range of dimensions of like fragments made the task of determining the overall height of the scene building difficult as the highest extant remains on the *scaenae*

[4] The software used to create the three dimensional models were 3D Studio Max and FormZ. The reconstruction of the main body of the theatre also used AutoCAD 2000.



6. View of reconstructed theatre (A. Hutson).



7. Portion of reconstructed *scaenae frons*.

frons are two short sections of lower order architrave at the east and west ends of the scene. (The heights of these sections from the stage floor are 7.70m and 7.85m respectively). The accumulative difference between the lower and upper end of the range of dimensions of the fragments between the lower podium and the cornice line of the upper order could as much as 109cms based on the record of the surviving fragments.

The computer model of the reconstruction used the heights of extant lower order architrave and a reasonable median for the remaining elements to propose a structure that located the top of the upper order pediment at 15.29m above the floor of the orchestra. If we assume a stage roof sloping at 22.5o and about 80cms thick, the overall height of the stage building to the apex of the roof would have come to the same height as the balustrade around the top of the *cavea*.

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