

AN ARCHAEOLOGICAL SURVEY OF THE THEATRE MOUNT AND CATCHWATER REGULATION SYSTEM AT SABRA, SOUTH OF PETRA, 1980.

by
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The towns of antiquity were just as dependent on their water supply for their rise, development and respective size, as are the towns of our own day. A wealthier or more consistently developed settlement could afford more complex provision with that vital element in those days, too, and thus attract more inhabitants. There was yet another problem to be solved in regions with both a mountainous terrain and low rainfall: the water provided by the winter precipitation had to be regulated and, as far as possible, stored for the summer dry season. At the same time there was also the need to protect the town and its environs

from the effects of this 'torrential downpour. The ancient city of Petra, whose northern Hubta water supply system has only recently been described after being subjected to intensive investigation¹, provides a perfect example of the significance and interdependence of water supply, precautions against flash flooding, water storage and the size of a town. As well shall see, this observation applies with equal validity to the water supply for the ancient ruined settlement of Sabra, situated some 7 km from Petra in the wadi of the same name and so far relatively uninvestigated. (Fig. 1)

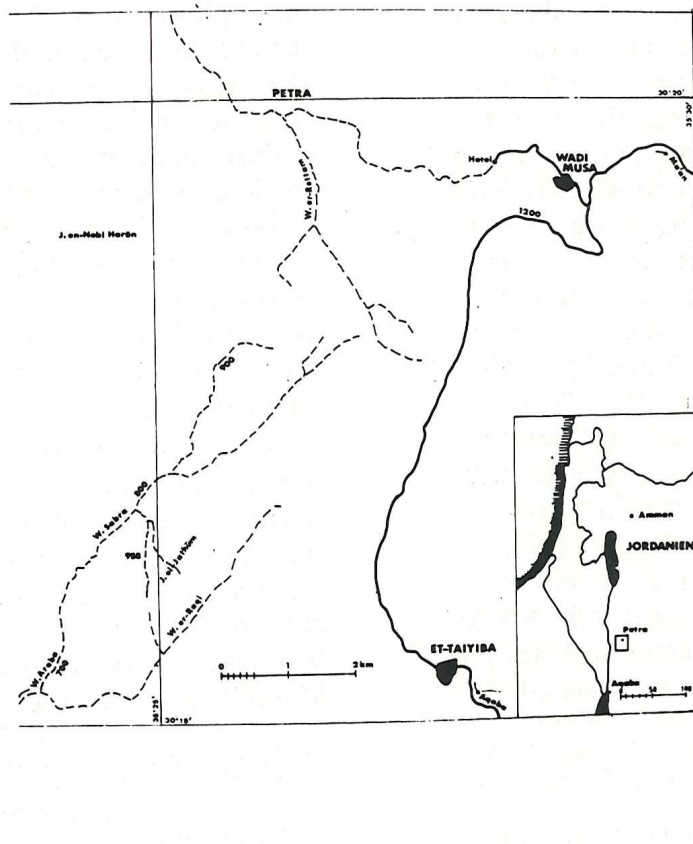


Fig. 1. Sketch map of the site of Sabra Theatre

1. E. Gunsam in "Petra und das Königreich der

Nabatäer". Editor M. Lindner. 3rd Edition. Munich 1980, p. 302-312

The first European of modern times to visit Sabra was in all probability Leon de Laborde in the year 1828.² The Count, an insatiable traveller, drew a map of the site which was later reproduced by Brunnow and von Domaszewski in their "Provincia Arabia"³. Although he overlooked a number of settlements on the surrounding hills he did record with relative accuracy the ruins of temples, a bridge and a theatre, all of which he assumed to be Roman. Laborde regarded the orchestra of this latter theatre in the rock wall opposite the town proper as a large water basin in which mimic sea-fights were staged, similar to the Roman naumachiae. He also spotted the walled reservoir above the theatre but felt that it was too small in size to compensate effectively for the evaporation of the water stored in the orchestra. After some consideration he rejected the idea that this water served only as a cooling system. M.-J. Lagrange⁴ one of the next to visit the area, adopted Laborde's views. He also thought that Sabra was no more than an adjunct of Petra with the sole purpose of providing the town's inhabitants with the luxury of naumachiae. Brunnow and von Domaszewski, questioning the use for naumachiae at the site, probably made only a hurried visit to Sabra on horseback.⁵ The theatre at Sabra could be reached from Petra in 1 hour and 48 minutes. Kammerer does indeed mention Sabra as a sort of suburb of Petra and reiterates its use for naumachiae, although he himself probably never set foot there.⁶ In 1925 Kennedy formed an opinion based on personal observation, though of a rather clearly established nature. In his view, the Romans had chosen the site for a military installation to defend Petra, because of a spring in the wadi yielding water the whole year round. Masonry, columns and capitals represented for him the remains of the

barracks and other garrison structures. Finally, the garrison troops had transformed the exit of a gorge on the south bank of the wadi into a theatre. The gorge had been bridged with stone seats under which an opening allowed the downpour of rainwater to discharge into the wadi. Still later, he concluded, a small colony of traders joined the garrison and in the final stage Sabra had even become a sort of winter resort for the inhabitants of the capital. Kennedy makes no mention of the suitability of the theatre for naumachiae.⁷

N. Glueck, reporting in 1940 on an earlier visit to the site, drew quite different conclusions.⁸ He regarded Sabra (es-Sabrah) as an extensive Nabataean mining and smelting centre. To the west of the actual site of the ruins, he discovered large deposits of sandstone of high copper content, and in widespread sections of the wadi numerous iron-ore probes and mining galleries as well. He also found piles of copper-ore slag in some of the ruined structures above the wadi dam. He was of the opinion that the gorge above the theatre had been artificially enlarged and the section of the wadi between the theatre and the smelting works had been paved with rectangular slabs of sandstone. Using the large number of Nabataean fragments as his basis, he dated Sabra in the period between the second century B.C. and the second A.D., but regarded it as extremely probable that the Romans continued to use the various edifices and installations after that date, too.

Like so many visitors before him, the writer had only had a few hours' time during earlier visits he had made to Sabra in the years 1969, 1976 and 1978.⁹ Despite the brevity of the visits, one impression remained clear: the splendour of the temples and other edifices on the "Temple Mount" as evidenced by the individual

2. Léon de Laborde: *Journey through Arabia Petraea*. London 1836, p. 195-197; *Voyage de l'Arabie Pétrée*, Paris 1830

3. R.E. Brunnow u. A.v. Domaszewski: *Die Provincia Arabia*. Vol. I, Strasburg 1904, p. 425-427

4. M.-J. Lagrange: *Rev. Bibl.* 1898, p. 166, 179

5. *Op. cit.*, Vol. I, p. 425

6. A. Kammerer: *Pétra et la Nabatène*. Paris 1929, pp. 273, 328, 383/384

7. A.B. W. Kennedy: *Petra — Its History and Monuments*. London 1925, p. 19-25.

8. N. Glueck: *The Other Side of the Jordan*. AASOR, Cambridge.

9. M. Lindner: *Jahresmitt. d. Nat. Hist. Ges.* Nürnberg 1978, p. 90-91

finds, the complex catchwater regulation system in the wadi, the surprisingly high number of Nabataean potsherds, the ruins of noteworthy settlements along the slopes on both sides of the theatre, and finally the theatre itself, made it seem highly likely that Sabra was not founded as a Roman garrison, but was originally a Nabataean, and probably then a Roman city of considerable importance.

The writer was convinced of this in 1978 when he commenced his investigations of the catchwater regulation system in the high-lying valleys below the Jebel el-Jathum¹⁰ as well as the theatre and reservoir. With the generous permission of Dr. Adnan Hadidi, Director General of the Department of Antiquities, who also requested and received a report on the present state of the antiquities at Sabra, the writer was able to spend 5 days in May 1980 on a detailed investigation of Sabra's water supply system, taking as his starting-point the "Theatre Mount".

The results of his investigations are presented here in three sections:

- 1) The Theatre
- 2) The Catchwater Regulation System
- 3) The Sabra Dam and Water Channelling System

The Theatre at Sabra

The theatre at Sabra is hewn of the sandstone rock from a gorge of the precipitous Jebel el-Jathum on the southeast side of the Wadi el-Jathum. On the right-hand side of the auditorium--here and in what follows always as viewed from the stage--some 150 stone seats have survived on 10 rock steps. Towards the center and along the entire left-hand side there are strongly weathered, foot-worn steps which are deeply channelled in part. One finds it difficult today to imagine them capped with stone seats. Since the theatre represents both the visual and actual

conclusion of a regulation system for catchwater from the high-lying valleys of the Jebel el-Jathum (to be described later), measurements were taken. The orchestra was found to be not an exact semi-circle as in the "theatrum latinum" of Vitruvius. However, it proved impossible to establish its exact original groundplan because the left-hand section of the auditorium had been destroyed and the skena washed away or buried beneath debris. Measurements were taken from the "fountain basin" (cf. infra) (C) along the arc of the circle to the furthest extremity of the upper edge of the orchestra in the rock (B), and then transferred along the arc to a distance of 25 metres on the other side. The point thus obtained, (A), was then marked in the debris and the line A-B measured as 22 metres in length. Point N was obtained by halving the line A-B. The distance between N and C was then found to be 19 metres, from C to B 22 metres, and the diameter of the orchestra 24 metres. Such a geometric structure does not yield a genuine segment of a circle. At the present time, it is not possible to say whether this form was the result of inaccurate measurement or due to the accommodation of the theatre ground plan to the difficult terrain. At any rate the auditorium extends beyond the limits of the semicircle in the manner of a "Greek" theatre. According to Vitruvius¹¹, this was to allow for a larger orchestra, a stage structure situated further back and a somewhat more shallow stage. Here only the actors performed, whereas the remaining members of the cast were in the orchestra. The measurable height of the enclosing wall of the orchestra varied between 2.20 and 2.65 metres, the lower height was measured in the region of the debris-covered *skene* and the higher towards the mountain side.

Below point B, remains of a double course of masonry, together 2.10 metres in width, are to be found which extend the curve of the orchestra in the direction of the

10. According to the map of the "Jordan Dep. of Lands and Surveys", 1961. On the aerial map of Sabra the same massif is called "Eth Thrayya - Wal Qamar" and is designated a "religious

rock".

11. Vitruv: Zehn Bücher über Architektur. Übers. v. C. Fensterbusch. Darmstadt 1924, S. 227-237. Abb. 11, 12.

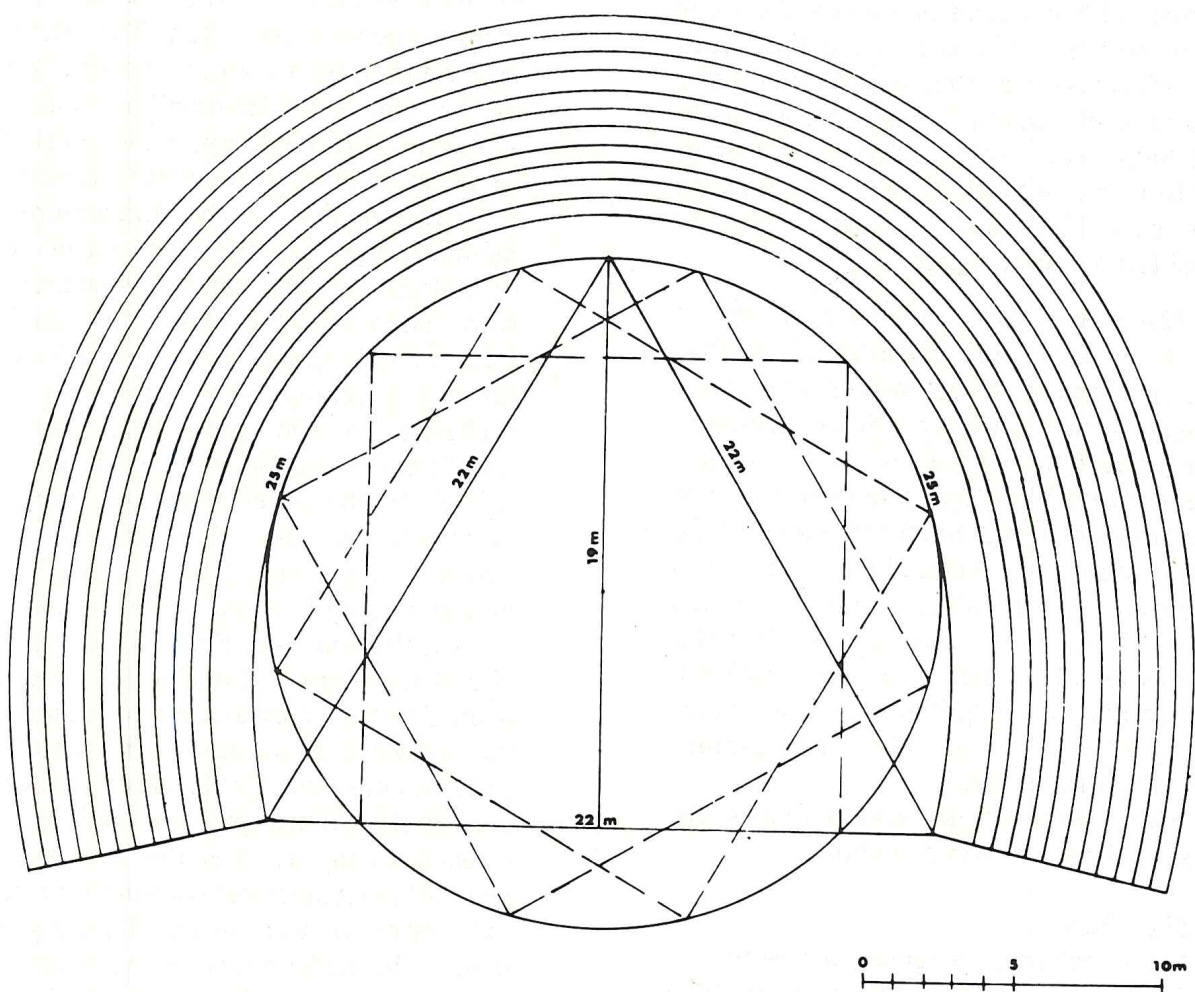


Fig. 2. Ground plan of the Sabra Theatre

skene, for an additional 4.80 metres in the case of the inner wall, and an additional 5.40 metres in the case of the outer. Still further beyond B, a single layer of masonry runs at right angles to A-B in the direction of the wadi. Here it probably joined a stone wall running parallel to the course of the wadi, and has survived for a length of some 6 metres. The left-hand segment of the theatre is badly damaged. It is still possible, however, to make out a double course of masonry below point A similar to the one just described. It does not follow the curve of the orchestra but rather runs down to the bed of the wadi at right angles to A-B. In the wadi itself some

extremely large foundation stones, as a direct prolongation of the double course of masonry, are still to be found--apparently still *in situ*. Their purpose hopefully will become evident with further investigations.

In two sections on the right-hand side of the auditorium, the seating stones are relatively well preserved to just beyond point B. The measurements of two of them were taken: one--*in situ*--measured 0.65 (0.56) x 0.60 x 0.42 metres. The variations in depth at the seating surface and the base are to be accounted for by the convex rounding of the front upper edge. A second seating stone which had fallen into the orchestra measured 0.57 (0.50) x 0.82 x

0.39 metres, which means it was not quite as deep, but roughly as high and of greater width. The upper-most row of seating stones had backrests, which, together with the rounding of the front upper edge, made them comfortable. The overall height of the seats was increased by the backrest to 82 centimetres. Together the backrests, at least on the right side, formed a type of raised rear wall which was perhaps intended to improve the acoustics.

In order to obtain additional data on the size of the theatre, measurements were taken and drawings made of a profile of the theatre on the inside of the surviving stairway between the two well-preserved sections of seating to the right (Fig. 3). The

angle of inclination of the rows of seats was found to be roughly 40° and the diameter of the entire structure approximately 39 metres. Only by removing the debris from the orchestra and from what remains of the *skene* would it be possible to establish how many of the rock-hewn steps were capped with seating stones. A number of such stones are also lying in the left-hand half of the orchestra. Depending on whether the central sections of the *cavea* were provided with seats or not, the theatre would have seated between 500 and 800 spectators, as a "seating test" showed.

Beneath the central sections of the auditorium, there is a peculiarity about the theatre at Sabra which is noteworthy. The

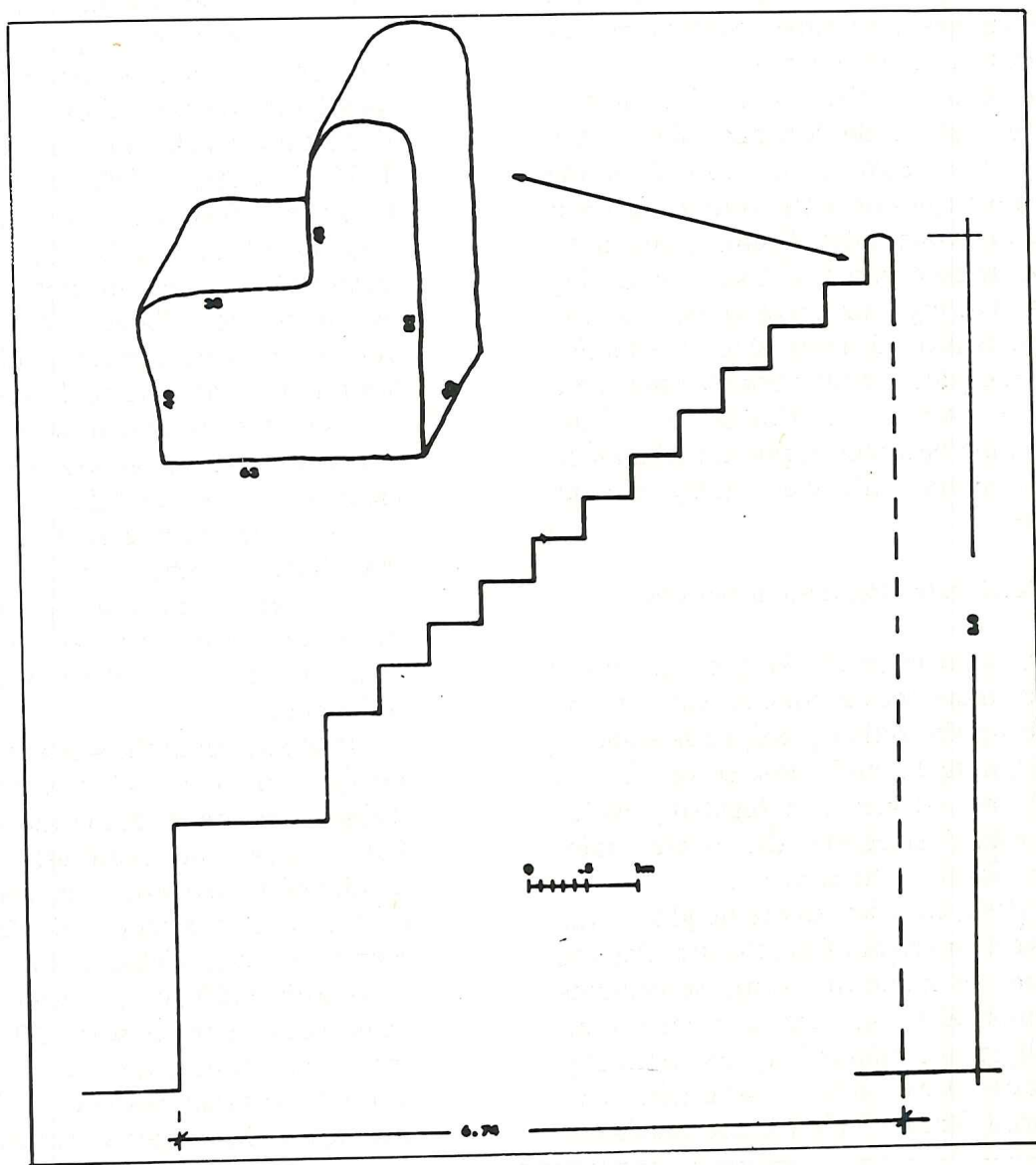


Fig. 3. Inner section of the Theatre.

lower steps, which were situated where water could flow, and today still occasionally flows, into the orchestra from the higher-lying reservoir, are interrupted only by a fallen rock that the constructors of the theatre either could not, or did not wish to remove. The latter is more probable, for underneath it a "fountain basin" was constructed which could be reached via 8 steps, each 0.9 metres in width. This structure is interesting for two reasons. On the one hand, the fallen rock could have cultic significance. In the Wadi She'b Qes at Petra, the idol niches and an inscription bear witness to the site of a fallen rock being regarded as a "sacred" place. On the other hand, the existence of the "fountain basin" makes it even less probable that the orchestra was used either permanently or primarily as a water tank. As in other ancient theatres, there is a wide channel however only on the left-hand side, in the rock at the height of or instead of the uppermost rows of seats, with a narrower and deeper water inlet. A ledge enabled the channel to be covered with slabs or seating stones. During our investigation of the theatre, it proved impossible to establish where the water of the rock channel came from or where it flowed to. This observation becomes important when seen in connection with the totality of our findings.

The Catchwater Regulation System

On a cold day in 1978 in the company of several others, the author climbed from the theatre up the rather precipitous slope of the "Theatre Mount" situated on the left (N.E.) and arrived at a high-lying valley from which evidently the winter rains poured down to the city.¹²

In 1980, we climbed the heights to the southwest and right of the theatre. Passing the ruins of numerous slope settlements and, *inter alia*, an arched niche in an *arcosolium*, we climbed up the naturally terraced bed of a stream, the "Terraced-Stream Valley", and reached a

narrow defile easy to close off (Pl. LIX, 1). Finally, after further climbing made easier by artificially hewn steps, we reached a spur overlooking the Wadi Sabra on both sides. Here we found fine, painted Nabataean potsherds, which suggested that sacrifice had been offered on that height in Nabataean times or by Nabataeans. This custom of offering on "high places" is familiar from Petra. Behind the spur, the ascent continues across a scree-strewn slope above a waterfall, until a steep gorge is reached, particularly distinguished by its numerous juniper and carob trees. Today it drains directly into the Wadi Sabra but there are some indications that it used to discharge its water into the "Terraced-Stream Valley". The climb ends at a fissure from which one descends through a chimney-type formation to a high-lying western valley below the Jebel El Jathum, which we had not penetrated in 1978. This time we followed it to its source, a gorge full of junipers, broom, honeysuckle, cuckoopint, daphne, mayweed, grass etc. In contrast to the first section of the "Theatre Mount", a scant number of ancient sherds and a few steps hewn out of the bare rock were found.

Here the mountain slopes of eroded sandstone rise up almost vertically to a great height. Nevertheless, traces of men and animals of quite recent date indicate that there are other access routes besides the ascent both sides of the theatre, probably to the northeast via a high-lying valley to the east which has still to be described.

If one descends the western valley in the direction of the Wadi Sabra, one crosses at its end some outcropping rocks which one has to negotiate cautiously, hand over hand, before arriving at the fourth terrace on the edge of a deep gully dotted with a number of water-filled basins. The gully is of smooth-polished rock, wide open at the front and penetrates some 30 metres into the mountain-side, with a small, water-filled basin of some 2 x 2 metres in size below the winter waterfall. Nearby a

12. M. Lindner: *Jahresmitt. d. Nat. Hist. Ges. Nürnberg* 1978, p. 90-91.

strongly weathered rectangular-shaped niche seems to be hewn out of the rock. This "Niche Terrace" discharges its waters from the high-lying west and east valleys into a very steep, inaccessible gulch about 30 metres in depth containing water basins and one large pothoole or kettle. Below the gulch an inaccessible basin has been cut by the flash floods. It spills into a narrow, transverse gully -- entered by the author -- with several turpentine trees, overflowing in its turn into the third terrace some 10 metres below. This terrace extends some 19 metres into the mountainside and has a rock, which can be seen from the valley, wedged into the top of its open end. The third terrace measures 5 metres at its widest point and is so narrow at the front that it would have been easy to close off. However, no terraces of such a closure can be seen today on the smooth sides at the opening. From this point, there is no direct descent. One must either retrace one's steps or come further by attempting the arduous climb up the above mentioned transverse gully. This latter route brings one to the catchwater regulation system of the "Théâtre Mount", still to be described.

The second terrace, which lies some 16 metres underneath the wedged-in rock, can be approached not from above but from below via the mountain slope to the northeast, i.e., to the left of the theatre. At the point where the torrential downpour hits the terrace there is a basin, which in May 1980 contained some 30 cubic metres of water (Pl. LIX, 2). Both the basin and the terrace itself bear signs of human workmanship. The bedouins of the region bring their goats here to water during the midday heat and the water for the author's camp was also drawn from this basin.

No traces of artificial damming, and accordingly of storage, were found in the terraces of the catchwater regulation system that have so far been described. The favourable lie of the land and the water engineering aids, still faintly discernible today, may have sufficed to lead the catchwater in the desired direction and to check its force. How thick the damming structure would have to have been at the

requisite points can be deduced from the structural conversion of the first terrace into a reservoir beneath the second terrace. The dam is 14 metres long, 1.8 metres high and 2.1 metres thick. It is built of ashlar, which are well hewn, in part diagonally adzed and laid by employing the header-and-stretcher technique. Some 120 of the ashlar are still in their original place, whereas, on the righthand side, others have been wrenched out of their bonding and edged down below. The thickness of the dam structure (Pl. LX, 1) reflects the pressure the engineer expected the water stored behind it to exert. The terrace, now buried beneath debris, was hewn out of the rock in a rectangle to the N.E. and in a semicircle to the S.W. and measures roughly 14 x 11 metres. On the basis of the height of the dam and the original depth of the reservoir, we may presume that it held $14 \times 11 \times 2.4 \text{ m.} = 370 \text{ m}^3$ of water. A small outlet in the lowest masonry course allowed the water stored in the reservoir to fall 11.5 m. into the "Fountain Basin" of the theatre, without the pressure of the water bursting the masonry. Today there is a huge carob tree growing in the N.E. corner of the terrace.

We cannot be sure whether the orchestra of the theatre at the end of the regulation system (Fig. 4), 14 metres below, represents the last and lowest-lying reservoir or even whether this was its main function. This view would seem to be supported by its location at the conclusion of the system and by mortar remains on its inside surface. However, there are a number of reasons for arguing against such a supposition: firstly and paradoxically, that same reservoir on the first terrace which only discharged small quantities of water, then the "Fountain Basin", which would have been senseless if the orchestra were not empty, further the observation already made by Laborde that the water in the orchestra would have evaporated too rapidly in summer. Secondly, there is the consideration that an orchestra filled with water would have rendered normal theatre performances impossible, if we disregard the improbable *naumachiae*.

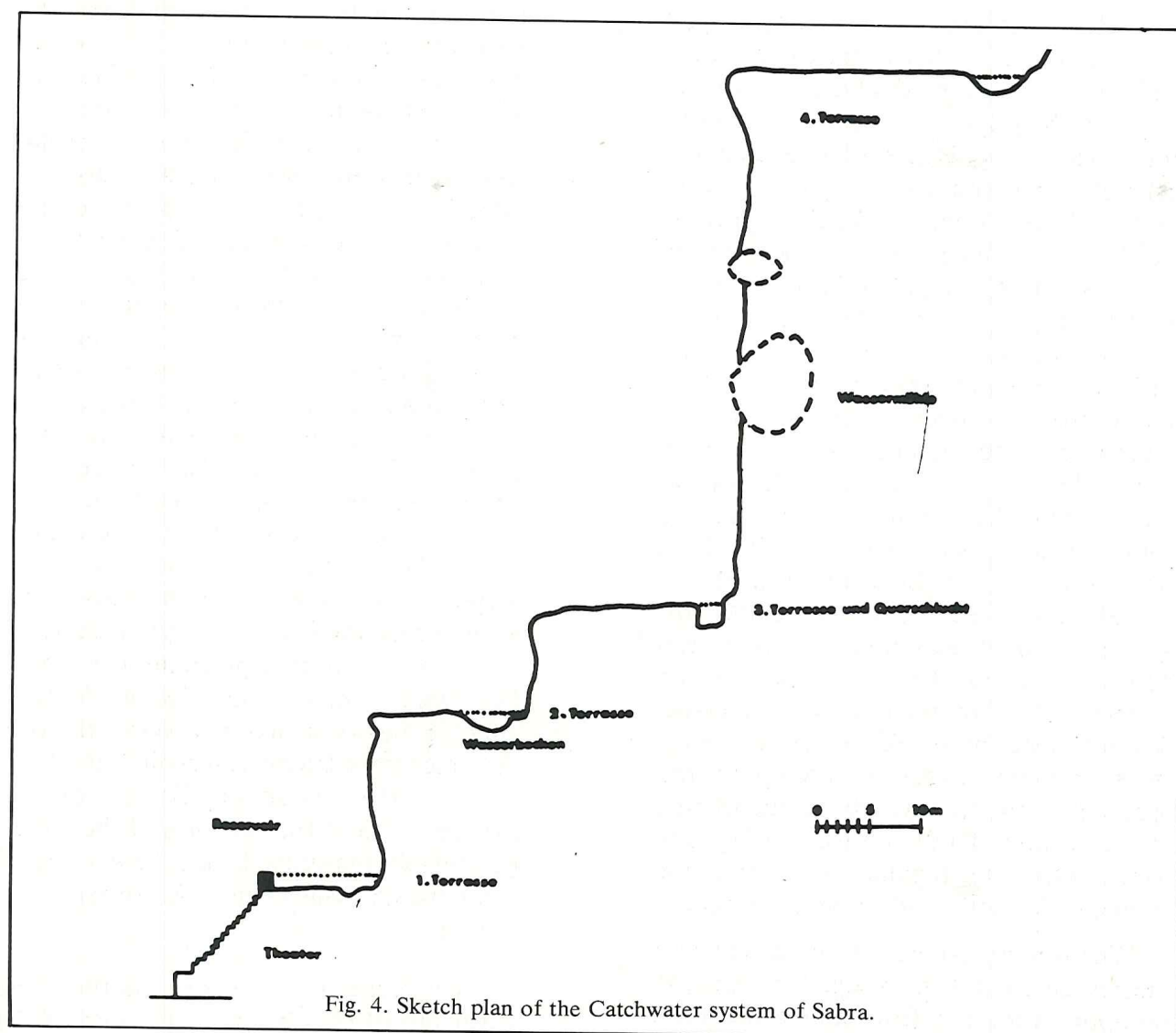


Fig. 4. Sketch plan of the Catchwater system of Sabra.

The Sabra Dam and Water Channelling System

If one crosses in an easterly direction a natural partition at the lower end of the high-lying western valley at the juncture where it discharges its waters into the regulation system described above, one enters a second, eastern valley. It runs almost parallel but terminates in a large, natural basin which was filled with sand and debris when we discovered it on 2 May 1980. The only gap in the rocks encircling it and through which the valley originally drained was sealed off by a massive wall situated some 100 m. above the Wadi Sabra and hardly visible from the valley itself. (Pl. LX, 2).

It runs from S.W. to N.E., is 14 metres

long, 4.6 metres high and 4 metres thick and is constructed of mainly grey, very hard and carefully-hewn ashlar in the header-and-stretcher-technique by the use of mortar mixed with small stone chips. A rock also of hard sandstone located in the centre of the gap was incorporated in the masonry. The particularly strong closure of the lower section of the eastern valley formed in antiquity — no other dating is possible — a reservoir of at least 30 x 30 metres. If we suppose a maximum water depth of 4 metres, it would store some 3.6 million litres of water.

A square opening whose sides are 0.7 m. in length and which is 3 m. in depth was discovered 1.10 m. above the lowest point of the external surface of the dam and almost exactly between the above-mentioned central rock and the N.E.

end of the dam. At the conclusion of this conduit we identified, by probing a small opening in the right upper section, more towards the centre of the dam structure which in all probability pierces right through to the inner surface of the barrage.

Almost exactly above this opening, a semicircle of stones has been dislodged from 4 or 5 courses of the masonry. We can only offer conjectures about the cause and the date of this destruction. Earthquakes during the first five centuries of our era have been demonstrated for the neighbouring town of Petra¹³. A military attack on the barrage is at least conceivable. A further possibility is that the mortar was washed out between the ashlar in the centuries after the fall of Sabra. However, in the course of time, as more and more sand and debris collected in the reservoir, their pressure was added to the pressure of dammed water¹⁴. Theoretically speaking a very early catastrophe could be construed. Could the dam have burst the very first time the reservoir was completely filled with water, because the structure proved incapable of passing the load on to the two slopes of the valley?¹⁵

On three of the masonry stones, one dislodged and two still in situ, bankermarks were found, recalling on the one hand a reclining cross or X and on the other a Nabataean or Sinaitic E. The external surfaces of some of the stones had been bush-hammered, whereas others had been diagonally adzed in the Nabataean manner.

Higher than the dam, a number of conspicuous stone blocks, some cut vertically, (PL. LXI, 1) were presumably left over from quarrying. The ashlar for the dam and the other installations had been quarried not below but above them in order to facilitate the transport of the stone. A huge "mooring hole" on the S.E. side of the dam would have helped to transport the stone and to anchor a crane.

The discovery of the ancient dam indicated the presence of a water channelling system starting nearby, since flash floods would already have poured into the above-mentioned regulation system before the dam was constructed. And sure enough, some 10 m. down from the dam, a channel was discovered, at first walled and then hewn out of the rock. It was 19-25 cm. in width and of varying depth according to the terrain. The slope below the dam soon fell steeply and confronted the planners and constructors with some difficult problems. Only in places could they direct the line of flow down a moderate incline. Then outcrops of rock had to be bypassed, steep sections traversed, bends constructed and even overhanging rocks mastered.

The channel hewn in the rock bypasses an outcrop of rock after the first flat stretch (Pl. LXI, 2). In doing so, it runs along the upper rim of the gulch between the fourth and the third terraces. From this vantage point some 80 paces from the dam, a good view is to be had of the Wadi Sabra. Some 60 paces further on there is a settling or collecting basin which is followed in its turn, some 70 paces away, by a steep incline. Between these two and below a spot where the channel ends abruptly there lies a section of guttering of whitish material. Evidently small defiles, the courses of streams and slopes of scree were bridged by aqueducts or walls topped by guttering. In several places outjutting rock where the guttering is interrupted and precipitous sections have been overcome merely by letting the flow of water fall freely into the basin. Some 35 paces further a big juniper tree grows at the end of the rock-cut channel, just before a screen-covered section, which either contained a basin or was spanned by an aqueduct. Be that as it may, this is followed by a flat stretch some 100 paces in length which terminates in a sharp curve. Shortly

13. About the phase of destruction of ca. 355 A.D. vid. Ph.C. Hammond: Excavations at Petra 1975-1977 ADAJ XXII (1977-78)

14. The author thanks Prof. Dr.-Ing. G. Garbrecht for this suggestion.

15. The writer is grateful for this suggestion to Dipl.-Ing. Otto Miller, Nürnberg. On the other hand Ing. Heinrich Zech, Nürnberg, tells me that according to his calculations the dam was alone through its weight able to withstand the pressure of more than 3.6 million litres of water.

before the curve, there is another juniper tree, dead, in the middle of the channel. Here, too, the only stone artifact was found: a cutting implement of blue-grey flint (Fig. 5).

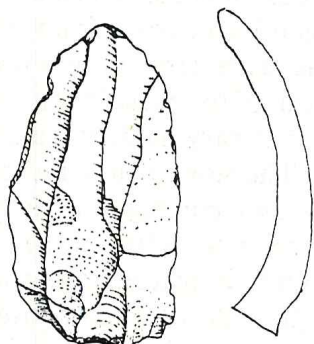


Fig. 5. A flint implement found at Sabra.

From there on the terrain becomes extremely difficult and climbing on the eroded sandstone places some demands on the climber. However, the channelling system had had to be followed, inspected, and repaired in antiquity too, and presumably one follows the same course today. This section ends, surprisingly, 30 paces down the channel. Here the water used to flow freely into a hollowed-out basin with outlet hole. Some 25 paces later. After traversing other steep sections, one comes to a spot where further climbing is out of the question. The water was here conducted down the valley and towards the theatre by means of an almost vertical rock channel (Pl. LXII, 1). The author was forced to turn back here, roughly at the height of the second terrace and return in the oppressive midday heat via the dam, the "Niche Terrace" and the "Terraced-Stream Valley" to the camp near the theatre. Crossing from the catchwater regulation system to the latter valley was rendered easier by steps hewn in the rock face.

This almost vertical channel can be seen from the Wadi as a fine line on the rock face, which is particularly discolored here. At the same time, it was also possible to make its continuation and its linkup with a

further section crossing the second terrace, which was easily accessible from below and supplied us with the water for our camp. After a strongly eroded flat stretch of terrain below the almost vertical rock channel (which we had not been able to reach previously), the water was conducted through a gutter still in situ which served as a water spout (Pl. LXII, 2). The water then fell some 10 m. into a large basin, half cut from the rock and half built of diagonally adzed stone, from which again a channel emerged. Some 20 paces beyond the inaccessible section near the reservoir on the first terrace, this part of the channelling system simply peters out in the debris and eroded stone. Even after the most painstaking search it proved impossible to pinpoint its course again.

It was thus not possible to determine where the channelling system originating at the dam in the eastern mountain valley terminated. Erosion by torrential downpours and wind-borne sand have to a large extent destroyed this part of the rock face, as well as the left half of the theatre. Various courses which the channelling system could have taken are conceivable and by no means mutually exclusive. Perhaps it was connected up with the wide water channel running around the top of the left-hand side of the auditorium (Pl. LXIII, 1), which is provided with a narrow ledge and can be covered with slabs or seating stones.

The water from the large reservoir may also have been conducted to the Wadi via the masonwork channels and guttering of the type found to the left of the theatre, then across the Wadi to the slopes of the "Temple Mount" (Pl. LXIII, 2) or to the former oasis around the Wadi spring. As has already been mentioned, similar guttering has survived in the top section of the channelling system. N. Glueck had found gutterguttering near the Wadi Hasa¹⁶, the writer between the Nabataean temple of Wadi Ramm and the esh-Shellaleh spring.¹⁷

16. N. Glueck: *Explorations in Eastern Palestine*, III. AASOR XVIII-XIX (1937-1939), p. 57
17. M. Lindner: *Eine archäologische Expedition*

nach Jordanien (1973)
In: *Jahresmitt. der Nat. Hist. Ges. Nürnberg* 1973, p. 39-41

Although it is true that the entire complex at Sabra can be dated with certainty to the centuries at the beginning of our era and with even greater certainty to the first centuries A.D., it is still not possible at the present time to state the exact date. Undoubtedly, further indications are to be expected from the potsherds found. The surface ceramic finds from the slope settlements of the "Theatre Mount" and as far as the catchwater regulation system, along the water channelling system and in the mountain valleys, along with the surface finds of the "Temple Mount" were given to F. Zayadine of the Department of Antiquities for purposes of identification. With his kind permission the results are published here:

Surface Finds of Ceramic Fragments at Sabra

- 1) Slope settlement to the S.(W.) of the theatre: Nabataean, Later Roman, Roman, a few Byzantine
- 2) Slope settlement to the N. (E.) of the theatre: A few Nabataean, most Roman
- 3) "Terraced-Stream Valley" to the big dam: Mostly Nabataean, a few Roman
- 4) Upper slopes of the "Theatre Mount": late Roman
- 5) Water channelling system on the "Theatre Mount": 2 potsherds perhaps Nabataean, otherwise Roman
- 6) Mountain valley: Nabataean, Arabic, modern
- 7) "Temple Mount": Nabataean, (end of 1st cent. A.D.), late Roman, Byzantine

A handful of sherds picked up from the water channel around the upper left side of the theatre in 1969 were put together and completed by the Prehistorische Staatssammlung Munchen thanks to its Director Dr. H.-J. Kellner. (Pl. LXIV, 1).

With all necessary caution, it appears possible, on the basis of the surface finds of potsherds, to assign the construction and use of the waterworks on the "Theatre Mount" to the time from the 1st century A.D. to the Byzantine period. An earlier construction date is possible, a later improbable. The Nabataean, and not the

Roman or Byzantine elements, predominate among the ceramic finds.

Summary

The investigations into the water supply and regulation systems in the ancient town of Sabra (Fig. 6 and Pl. LXIV, 2) situated in the wadi of the same name southwest of Petra in Jordan provide new insights into how the water engineers of antiquity dealt with the problem of controlling and storing the catchwater of the winter season and of ensuring a supply of water all year round. At Sabra these installations were investigated on the more important side of the site, namely on the "Theatre Mount" or the area above the ancient theatre. Part of the installations was a dam located roughly a hundred metres above the theatre at Sabra and discovered by the author in 1980. The dam collected the catchwater draining off from a mountain valley and directed it downhill through an ingeniously contrived channelling system. Presumably the dam made possible, or was supposed to make possible, an uninterrupted supply of water during the dry period of the year as well. In addition there was also a catchwater system to regulate the precipitation of a second mountain valley and a number of side valleys and gorges. This system may also have included further reservoirs but was quite capable of slowing down the flash-flood waters without them and filled basins at several points, too.

The remainder of the catchwater was conducted to the valley via the "Terraced-Stream Valley" south-west of the theatre above the wadi spring. Beside the big dam definite traces of engineering work are to be found only immediately above the auditorium of the theatre, where another dam structure created a large reservoir. The question of whether and to what extent the orchestra of the theatre also functioned as a reservoir must remain open until it has been cleaned out and excavated. Some of the measurements and ideas recorded here, e.g. the finding that it is a "Greek" and not a "Latin" theatre in the Vitruvian sense, should be an incentive for such a venture. It was also possible to

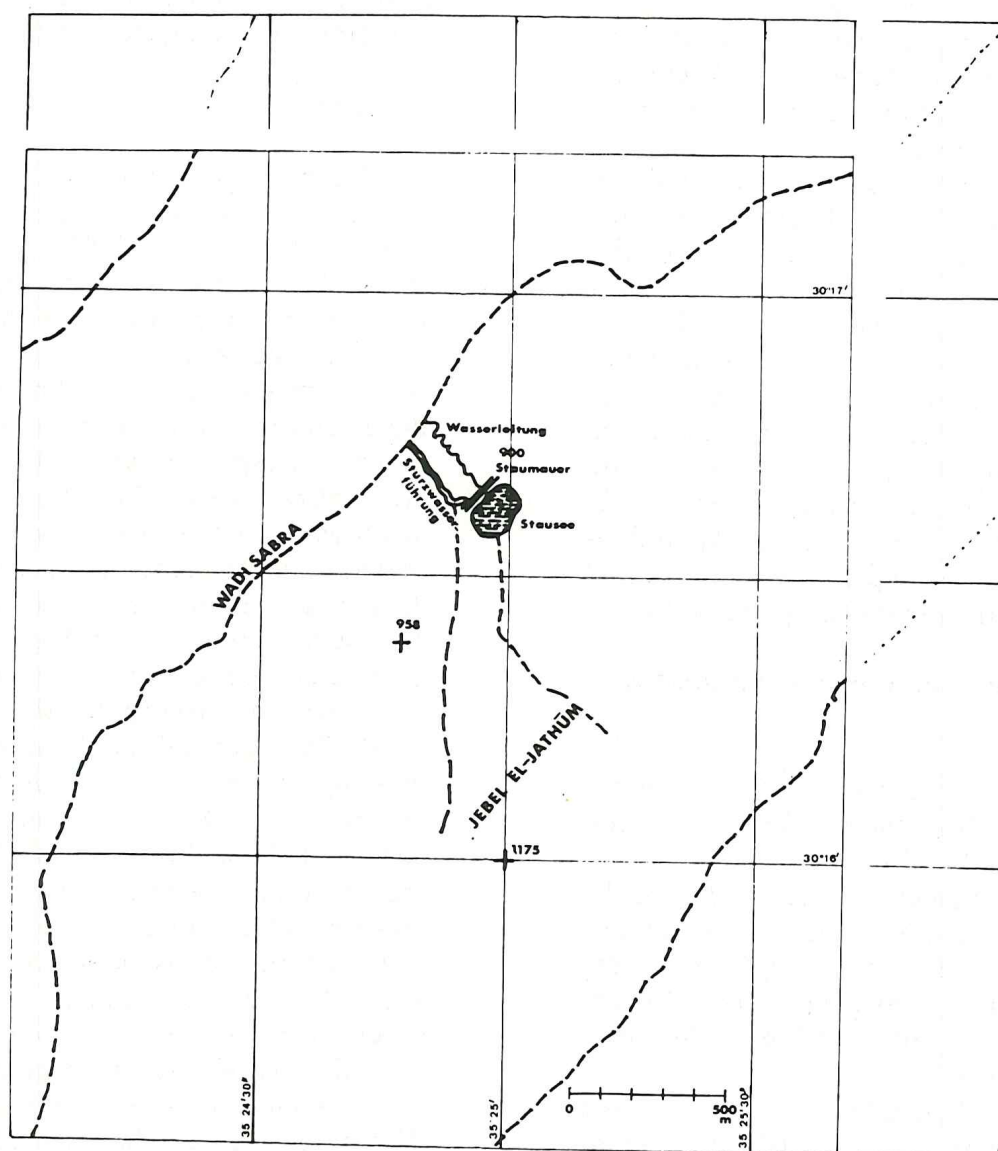


Fig. 6. The Dam system of Wadi Sabra Theatre.

date the theatre, the dam and the water systems more precisely: on the basis of the available clues, such as the surface finds of ceramic fragments and the employment of

diagonally adzed ashlar masonry, they have for the time being to be assigned to the first centuries of our era.¹⁸

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