

NABATAEAN AND ROMAN PRESENCE BETWEEN PETRA AND WĀDĪ 'ARABAH SURVEY EXPEDITION 1997/98: UMM RATAM

by

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Introduction

The area in 'Arabah called Umm Ratam is marked by a Qaṣr of the same name (or sometimes Qaṣr Wādī Mūsā) as its centre (YU 279 615)¹ (Fig. 1). The fortress, preliminarily presumed to be Late Roman, is located ca. 7.5 km (as the crow flies) from ancient Petra, above the confluence of Wādī Mūsā coming from the south-east, and Wādī Umm Ratam joining it from the south. The area was surveyed by teams of the Naturhistorische Gesellschaft Nürnberg (NHG) directed by M. Lindner and U.Hübner in October 1997 and 1998. Together with preceding explorations the project area covered ca. 100 km² including the passages between Petra and Umm Ratam.² An additional report on the vegetation, botany, lithics and pottery of Umm Ratam is being prepared.

Former Explorers and Previous Reports

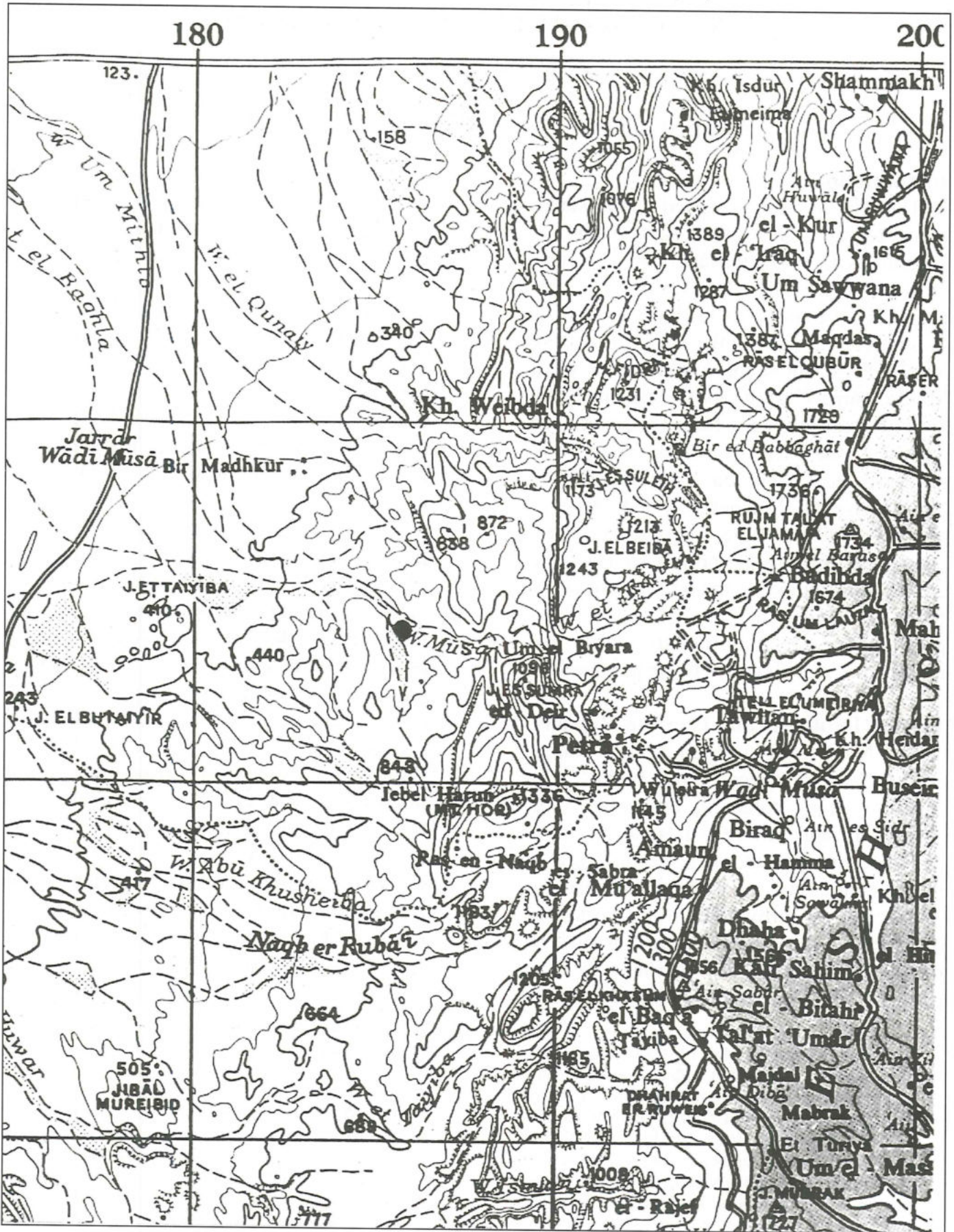
The NHG team surveyed in the footsteps of the German explorer Fritz Frank³ who came to Umm Ratam in December 1932 (Fig. 2). In spite of threats from as-Sa'idiyin bedouins roaming the area, he managed to measure and draw the walls of the Qaṣr and to describe its surroundings. Not possessed of special archaeological ability, though of intuition and excellent architectural experience, he noted "viel feine Keramik" in

the ruins of houses on the western bank of Wādī Umm Ratam (Frank 1934: 230). Two years later, N. Glueck started a survey of Edom with an impressive entourage of five colleagues, several Palestinians and four men of the Bani 'Aṭṭiyya, who took care of five camels. The trip was mostly concerned with the identification of sites through pottery. Bir Madhkūr was examined, but Umm Ratam was left out (Glueck 1934/35: 1.4). Qaṣr Umm Ratam is neither marked in R. Head's nor in Th. Raikes' (1985) sketch maps.

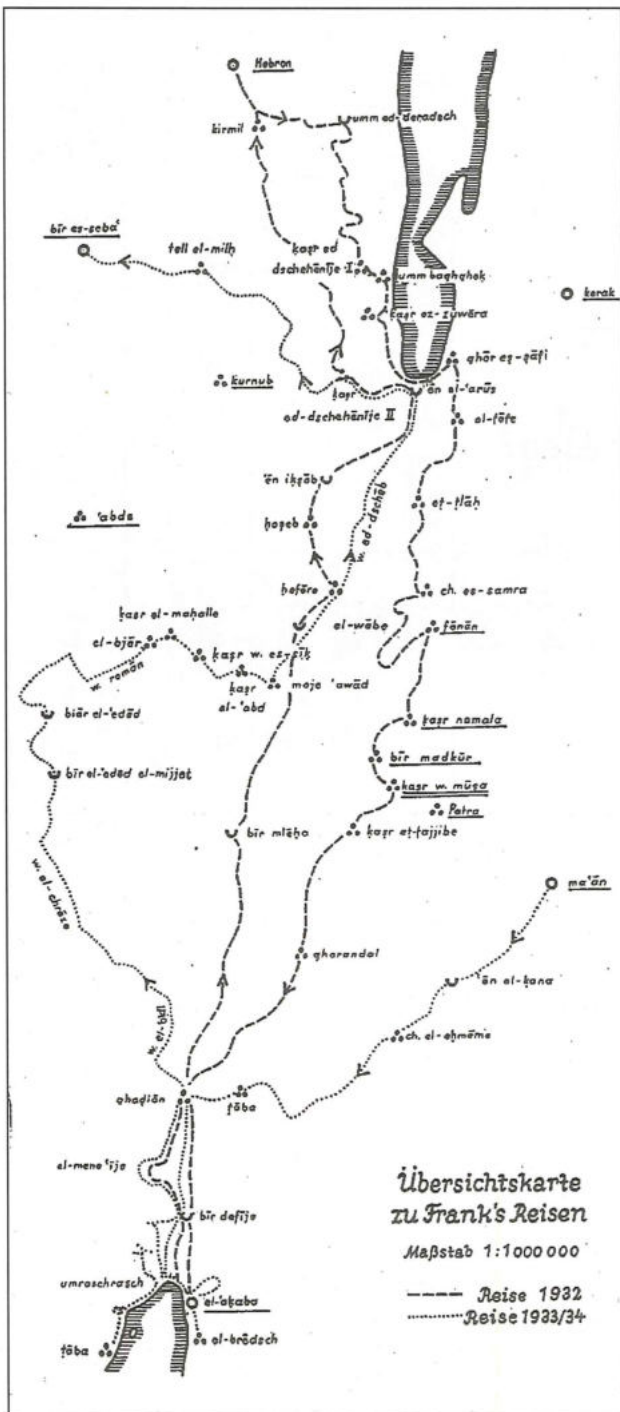
Investigating possible routes of Sultan Baibars' ride from Egypt to al-Karak in 1276, F. Zayadine traced the outlet of Wādī Mūsā to 'Arabah. He described a large terraced area, called "Roman Gardens" by the bedouins which extends at its mouth west of the Qaṣr. According to his report, the "caravan station" is situated "on a small island between two branches of Wadi Musa,... From there, a steep and narrow track climbs up to Petra by Wadi el-Siyyagh, or to Beida by Sleisel" (Zayadine 1985: 163). Ceramic surface material of Qaṣr Umm Ratam and the western bank of Wādī Umm Ratam was collected, analyzed and counted during a survey of Byzantine and Islamic sites in Jordan. The finds were Nabataean, Roman-Nabataean (twice as much), Roman (as

1. According to Palestine Map 1:50 000. 36R. UTM.
2. The project was supported with transportation and advice by the Department of Antiquities of Jordan (then Director-General Dr Ghazi Bisheh) and its local representatives Inspector Suleiman Farajat and Hani Fallahat. Members of the teams were Dr Dr Manfred Lindner (NHG), Prof. Dr Ulrich Hübner (Univ. of Kiel), Dr Dipl.Ing. Johannes Hübl (Univ. f. Bodenkultur Wien), Elisabeth Günsam (Architect), Ingrid Künne (Botanist), Antonie Schmid, Elisabeth Schreyer, Harald Gruber and

- our Bedouin friend Dakhilallah Qublan from Petra.
3. Fritz Frank from Stuttgart organized, as he said himself, the intelligence service from Jericho against the English, who had already occupied Jerusalem during World War I in winter 1917/18 (ZDPV 71, 1955: 187). According to A.Alt, he was a building engineer and a hunter (ZDPV 57, 1934: 193). Before he surveyed the 'Arabah in the winters of 1932/33 and 1933/34, he had been on Masada in 1932 (A. Schulten, 1933: 1: 185).



1. Archaeological Map 1 : 250 000 with the location of Qasr Umm Ratam.



2. Frank's sketch map of his surveys of 1932 and 1933/34 with "kasr w. musa" (ZDPV 57, 1934).

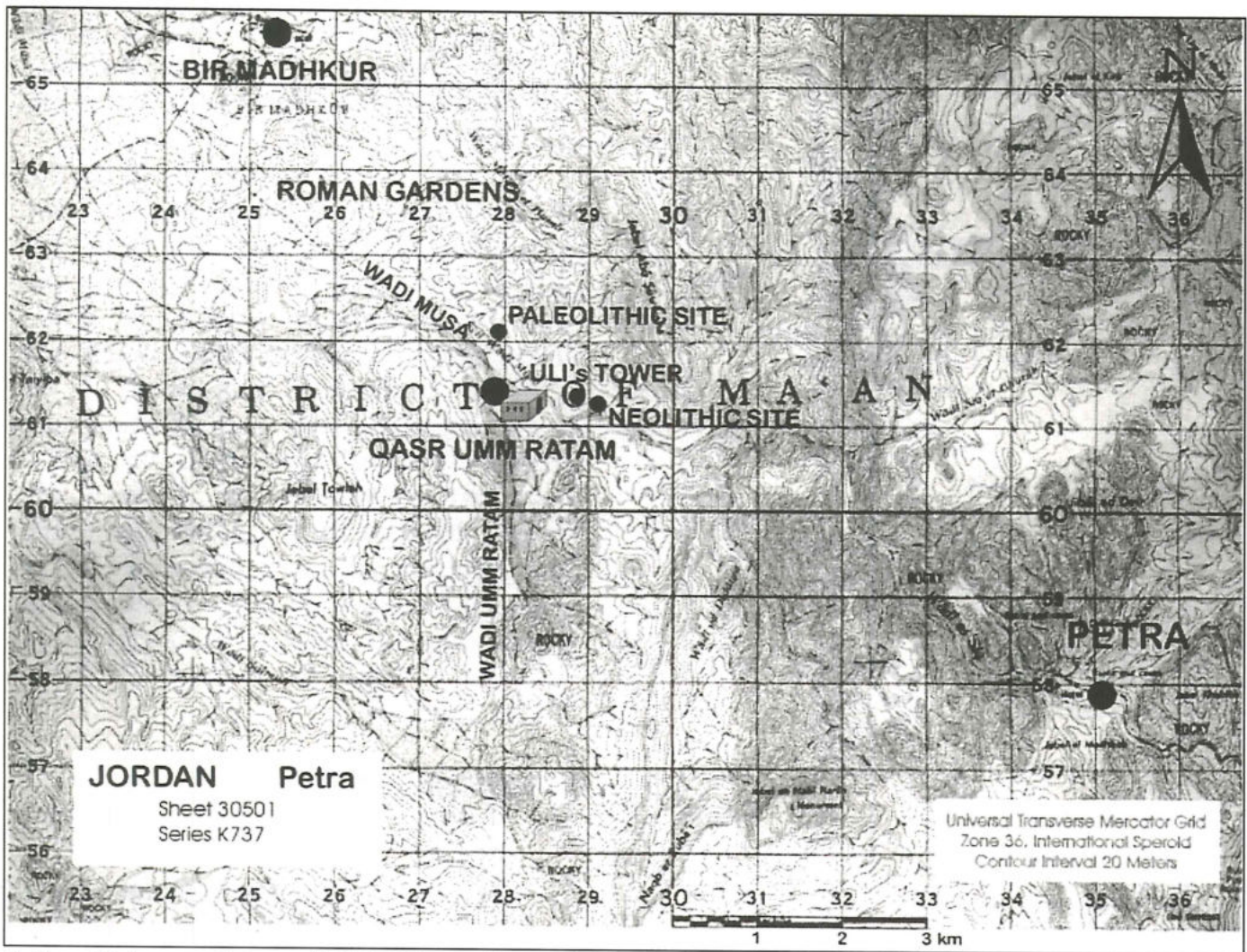
much as Nabataean), Early Roman (half as much as Nabataean) and (least) Byzantine (King *et al.* 1989: 205-212). Obviously, the result assessed the breaking of available pottery but not the occupation by people living in textile habitats and using no pottery. Besides, the position of Bir Madhkūr north of Umm Ratam in King's map (p. 206) does

not seem correct. In "The Typology of Roman and Byzantine Forts and Fortresses in Jordan" Qaşr Umm Ratam is not mentioned (S. Parker 1995: 251-260).

In a review and assessment of the "defense system" of Roman-Byzantine Southern Jordan, Z. Fiema mentions Qaşr Umm Ratam twice perfunctorily, once in a map and, a second time, in a list of larger military installations in southern Jordan as a Roman "fort (?)" of the fourth/fifth century. In Fiema's appraisal, term and meaning of a "Limes Arabicus" with defense in depth as proposed by Parker is not advocated. The "forts" between the Dead Sea and 'Aqaba are seen less in a pure defensive role but rather in "needs of internal security and the functioning of local administration and economy within the provinces" (Fiema 1995: 261-169).

The Project Objectives (Fig. 3)

1. Mapping of the area and its archaeological sites
2. Description, mapping and evaluation of the passages between Petra and Umm Ratam
3. Survey and drawing of the Qaşr fortification and the settlement
4. Chronology of the Qaşr, the settlement and other habitats at Umm Ratam including a detailed description of the pottery
5. Traces of pre-Nabataean occupants or settlers
6. Survey and assessment of the agricultural plains ("Gardens") down wadi from Qaşr Umm Ratam
7. Survey and plotting of the Wādī Mūsā Conduit and other means of water supply
8. The recent Bedouin population of Umm Ratam
9. Vegetation of the Umm Ratam Area
10. Assessment of the Roman presence at Umm Ratam



3. Umm Ratam area between Bir Madhkūr and Petra with Qasr Umm Ratam in center (J.Hübl).

The Ancient Passages Between the Petra Region and Umm Ratam⁴ (Fig. 4)

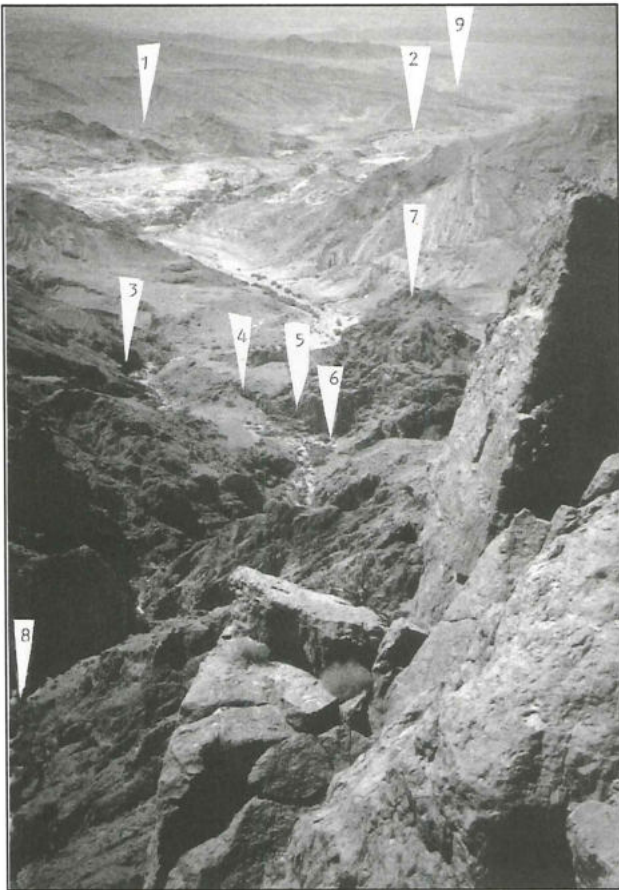
1. From Bir Madhkūr (YU 251 656) to Umm Ratam

Frank hiked from Jerusalem, Hebron, Faynān and Qasr Nemala to Bir Madhkūr and from there to Wādī Mūsā at a spot allegedly 8 km (?) distant from the Qasr which he reached by walking in the wadi (Frank 1934: 229). Glueck noted clearly marked trails to the south-east from Bir Madhkūr, “leading directly to Petra”, in March 1934 (1934/35: 36). He did not fol-

low them despite his conviction that “Bir Madhkūr ... guards a direct track to Petra” (1970: 88). M. Lindner accompanied the then Inspector of Petra by landrover from ‘Aqaba to Bir Madhkūr in 1976. Taiwan Chinese were building a section of the ‘Aqaba al-Karak road at that time (1976: 90-93). Still in 1980 and 1983 it was difficult for Europaeans to be permitted to drive to Bir Madhkūr and further on. Moreover, the tracks were so bad that even the four-wheel-drive of an Austrian team of NHG directed by Elisabeth Gunsam in 1980 had to be abandoned beyond Bir Madhkūr, and Umm

4. Prior to the 1997/98 explorations of the passages between Petra and Umm Ratam, Wādī Mūsā Conduit together with the whole region was - since 1983- first and primarily explored and documented with photographs by the Austrian mem-

bers of NHG, Elisabeth Gunsam and Antonie Schmid. In 1997, Johannes Hübl, Ulrich Hübner and Harald Gruber followed the conduit up to Petra and added their observations.



4. View from Rās Slaysil toward Wādī ‘Arabah and Umm Ratam 1. Wādī Umm Ratam; 2. Qaṣr and settlement of Umm Ratam; 3. Exit of Wādī Adulayia into Wādī Mūsā. 4. Aur Hor. 5. Conduit above S-bend of Wādī Mūsā; 6. Changing its direction, the Conduit runs to the aqueduct bridge over Wādī Mūsā; 7. Tur Imdai; 8. Wādī Mūsā near the Pond Temple at Sahir al-Baqar.

Ratam had to be gained by walking just as Frank had done in 1932. It was easier to reach Umm Ratam on camelback from Petra via Naqab ar-Rubā’i in 1993. The passage from Bir Madhkūr via Umm Ratam to Qaṣr Nemala and from there to Petra (see later) should have been possible from antiquity to present for men with camels, horses and donkeys. For a 4-wheel-drive, the track between Bir Madhkūr and Umm Ratam was no obstacle in 1997 and 1998.

2. Petra - Bayḍa - Jabal Qārūn - Umm Ratam (Fig. 5)

Umm Ratam was photographed from the

5. Concerning Tur Imdai, K.W. Russell is mentioned as having excavated the rock-shelter in 1990 but no publication is to be found (“In Memoriam

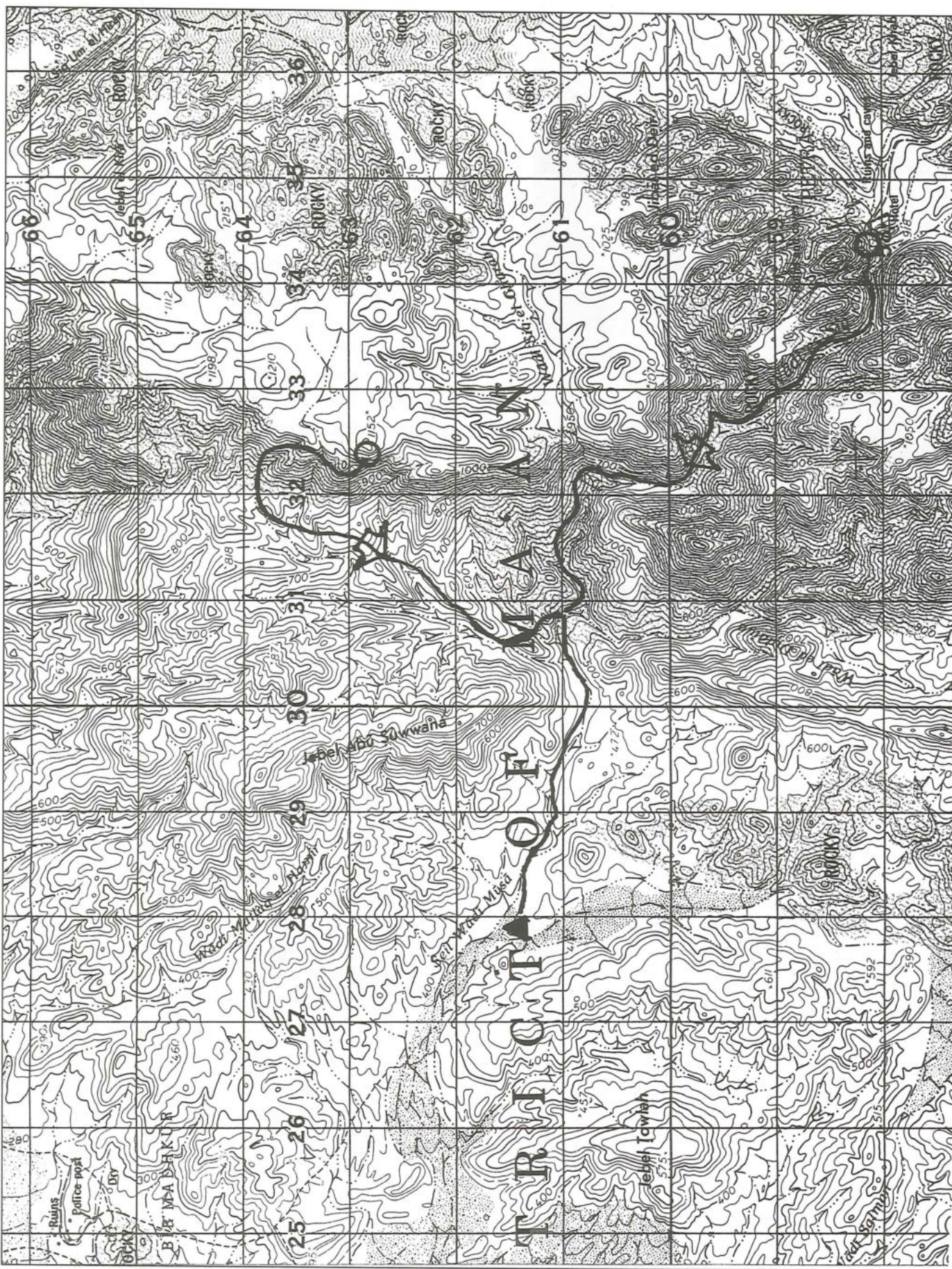
air in 1995 and visited together with Suleiman Farajat, Inspector of Petra, in 1996. Also prior to the 1997 expedition, a track between Petra and Umm Ratam via Bayḍa and Jabal Qārūn was thoroughly explored by Antonie Schmid and Dakhilallah Qublan in April 1997 (Unpublished report; typescript available). According to their itinerary, a partly substructed pathway swings in wide bends from Jabal Qārūn (YU 325 628, ~1180 m) first to the west and then to the south. A level area of ca. 45 x 45 m, presumed to have been a camping site for caravans, was called ‘Ayn Ghab al-Asamar by Dakhilallah. It is bordered by walls and supplied with a basin collecting run-off water. Surprisingly but consistent with the general variety of pathways in the region, a second path runs in the same direction. After passing natural waterholes the following bends are consolidated and substructed with large boulders. The location of a ruined 10 x 10 m compound above Wādī Umm Chrera built from sandstone ashlar of up to 0.70 m in length, is already marked as a quadrangle in the map *Al-Mamlaka al-Urduniyya al-Hashimiyya* 1: 100 000, 1953.

Hiking and climbing through Wādī Umm Chrera is wearysome, but there is a spring, though only with salty water. From the rock shelter of Tur Imdai,⁵ Umm Ratam is reached on the right (northern) bank of Wādī Mūsā. The passage may not be called a “road” but rather a well-worn track, partly substructed, dating back to antiquity and used to this day.

3. Petra - aṣ-Ṣiyyagh - Pond Temple - Umm Ratam

The last section of the pathway from Jabal Qārūn which may have been either a caravan route or just a local connection very probably joined another pathway running directly from Petra on the right side of Wādī

K.W. Russell 1950-1992 ”, *ADAJ* 37, 1993: 13). Musil (1907: 333) mentioned “tor Emdej” without having visited the place.



5. Map Palestine 1:50 000. Passages from Jabal Hārūn (northern route) and through Wādī as-Siq (southern route).

as-Siq or aş-Şiyyagh, as Wādī Mūsā is called while it passes through a steep-sided gorge. The eye idol of Atargatis of Mambij on its right rock wall marks a commercial route to Syria (Lindner 1991: 51-56; Lindner and Zangenberg 1993: 141-151). Originally substructed and even equipped with rock-cut steps in a short detour through Wādī Mirwān, it is negotiable for donkeys at present, probably also for camels in antiquity. That the route through aş-Şiyyagh, now badly damaged, was important is shown by a second pathway on the opposite rock wall which, however, is too much damaged to be surveyed. The pathway on the right side of aş-Şiyyagh gorge ends in the ruin field of Sahir al-Baqar, where remnants of a Nabataean-Roman temple were described by Lindner and Gunsam in 1995. This site has to be bypassed to the north in order to reach Wādī Mūsā again.

4. *Petra - Bayḍa - Rās Slaysil - Umm Ratam*

Both pathways (and another down from Rās Slaysil over an ingeniously built but destroyed road) met at the site of a Nabataean-Roman temple ("Pond Temple") of the 1/3 (4) cent. AD (Lindner and Gunsam 1995: 199-214). The sanctuary was obviously frequented by caravans and travelers and certainly by the Nabataeans and Romans of Umm Ratam who got their water from the area. Eventually, a pathway bypassing the Pond Temple may have run down to Umm Ratam on the right bank of Wādī Mūsā. At least, during the surveys of 1997/98 a wide detour on the right side was necessary. Unfortunately, owing to earthquakes and flash floods, the supposed crossroads proper is, together with the Pond Temple, hidden under a large ruin field.

5. *Petra - Wādī an-Naqab - Naqab ar-Ruba'i - Wādī Umm Qamar - Umm Ratam*

Elisabeth Gunsam and Antonie Schmid explored the possibility of reaching Umm Ratam on camel back from Petra in October 1997 (Unpublished report; typescript available). By the shoulder of Jabal Hārūn, they entered Wādī an-Naqab, running sometimes between man-made walls of large ashlar toward the north-west. The wadi is carefully terraced with staggered cross walls built of cut ashlar. At the transition of the wide, gently sloping catchment area to the steep wadi, a massive cross wall or dam, more than 20 m long, 4.20 m high and 1.30 m deep, is built of ashlar of up to 1 m length and a thickness of 0.35 m (Fig. 6). The gap in the double wall is filled with fieldstones.⁶ The area extending toward Naqab ar-Ruba'i is terraced with a lot of cross walls made of fieldstones to allow agricultural use. Continuing toward the south across Wādī Muqatta (?), Naqab ar-Ruba'i and Rujum ar-Ruba'i (1130 m) the latter supposed to have been a watch tower (Lindner 1992b: 263) and again in a southerly direction on a road substructed with large boulders, a second, similar building (1030 m) of 5 x 5 m is reached. The amount of tumbled building



6. Barrage (dam) in the Wādī an-Naqab.

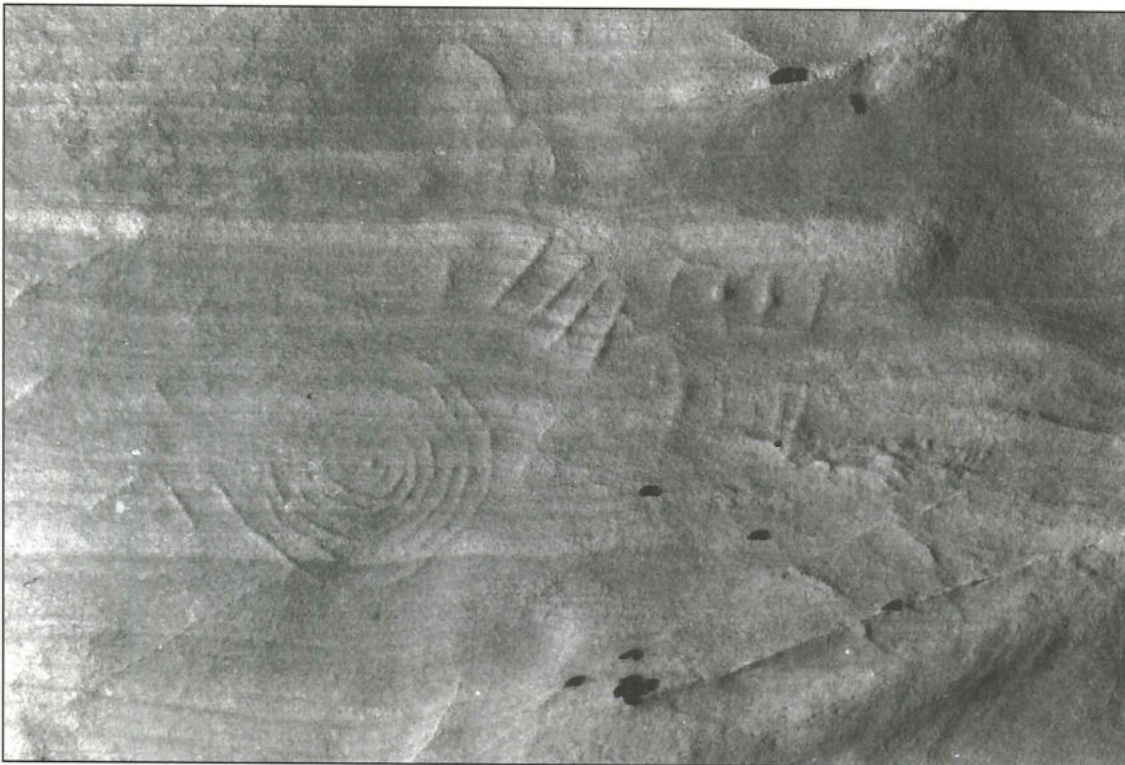
6. Like in similar cases, it cannot be affirmed that the cross wall was built in the Nabataean-Roman period. The stone material, however, is old (ancient probably) and reused, perhaps several times. It cor-

responds with the results of the Jabal Hārūn Project of 1997, i.e. that the area was used as an integrated agricultural system of the Nabataean first century AD and the Byzantine era (Frösén 1997: 496-499).

stones in the ruin indicates more than one storey of the original structure. The area is a crossroads between Khirbat Abū Khushayba, Umm Ratam and the copper mines of lower Wādī Abū Khushayba. 30 m further down, a plain of ca. 14 x 18 m is on three sides bordered by rows of large boulders. Protected by the watch tower, it might have been a resting or camping place (*khān?*) for caravans moving between Abū Khushayba and Umm Ratam.

The route towards the north follows a steep slope and a series of serpentine roads, sometimes marked by tumbled stones. At 860 m, another ruin of 4 x 6 m, made from well-cut ashlar (0.60 m long, 0.35 m wide) was noted.⁷ A few painted Nabataean-Roman sherds were taken from a robber's dig. A road section paved with large flat stones which had previously been seen in 1986 and 1993 was partly washed out in the meantime. The destruction in such a short time might prove that it was not ancient, or if it was, then it was ever so often repaired.

The way toward north running ca. 300 m below and parallel to the Naqab ar-Ruba'i massif is marked with stones and porphyry boulders, the remnants of a built road. After crossing Wādī al-Mustajilah with tumbled house-sized boulders, the route turns toward Wādī Umm Qamar with a notable spring. On the way, the petroglyph of a spiral (diameter 0.50 m) was either an apotropaic protection from or a warning of snakes (Fig. 7). At present, the wadi is impassable for camels and requires a wide detour. However, after it joins Wādī Umm Ratam, riding becomes easy, and, in Wādī Umm Ratam, Qaṣr Umm Ratam is reached. For riding, better trained animals (and riders) and a well-built, always repaired route are needed. Not counting an overnight camp under Jabal al-Mustajilah, it took the explorers less than four hours from ancient Petra to Qaṣr Umm Ratam. Because Naqab ar-Ruba'i has been mentioned more than once as an important crossroads, the route which also profits from a spring may have been often used as a pas-



7. Engraved spiral (snake?) together with wussum on rocky ground near Wādī al-Mustajilah.

7. Holes in the rocky ground of 12 x 12 cm were explained by the accompanying bedouins as fixtures for wooden poles and torches to light the sur-

roundings. Similar holes allegedly for poles to mark the way for caravans, were previously detected on the Petra- ath-Thughra road.

sage between Petra and Umm Ratam in antiquity and in recent times (cf. Lindner 1992b: 263).

6. *Petra - Wādī Adulaiya - Wādī Mūsā* (Fig. 8)

Eventually, a passage between Petra and Umm Ratam via Wādī Adulaiya was surveyed by U. Hübner, M. Lindner and I. Künne. This wadi can be reached from the shoulder of Jabal Hārūn and then down from Rās Adulaiya.⁸ According to the Palestine map, the Wādī Adulaiya runs fairly straight in a northerly direction. A narrow footpath indicates occasional use by bedouins. Stepping first cautiously over sharp basalt edges then in slipping limestone debris, a big threshing place surprises the hiker (Fig. 9). Looking around, lots of terraces and a cave harbouring crops are seen to the left (west) proving occasional agricultural use from ancient times to the present. A fine Nabataean and a geometrically decorated Mamluk sherd taken from the ground are reminiscent of different periods in the area's history. In the following valley, plutonic rocks of all kinds and colors accompany the small group of surveyors, our Bedouin friend and the donkeys which carry the luggage. We are not prepared for a pleasant rencontre. At a rock wall of gold-brown basalt a waterhole contains drinkable water - a "*guelta*" as it would be called in the Sahara. After passing a canyon, unexpectedly the valley opens to Wādī Mūsā. The remnants of large aqueducts crossing Wādī Mūsā and Wādī Adulaiya, previously reported and photographed by A. Schmid, are verified.

That Wādī Adulaiya can be considered as a passage between Petra and Umm Ratam is proven not only by the NHG team, but still more by Dakhilallah's son 'Auda who galloped on donkey back the steep way down across the limestone debris. According to U.

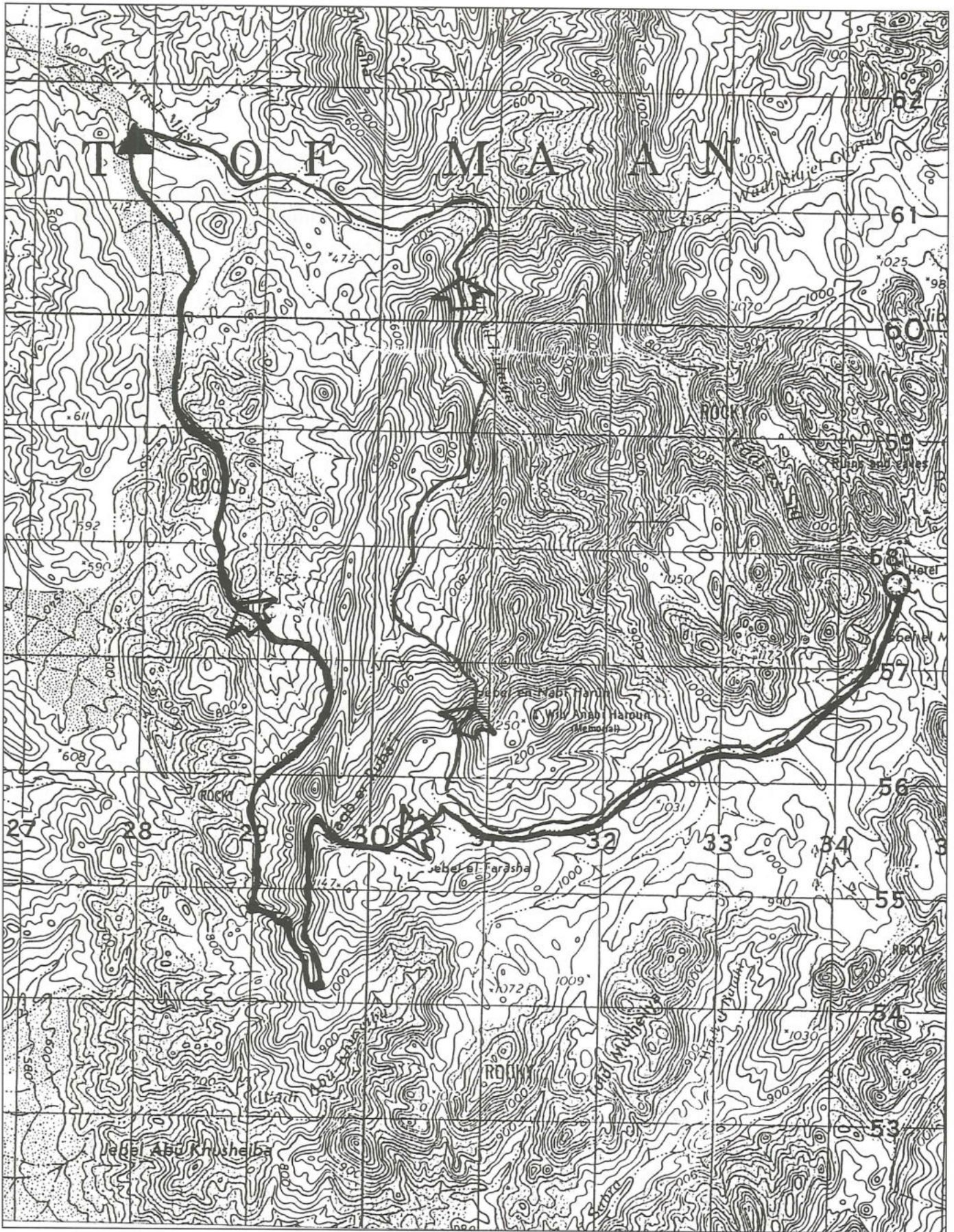
Hübner's observations, where Wādī Adulaiya joins Wādī Mūsā, the latter reaches its presently impassable section after the Pond Temple area has been left.

7. *Petra - Bayḍa (Umm al-'Alda) - Qaşr Nemala - Umm Ratam*

After innumerable hairpin bends, the modern road from Bayḍa to 'Arabah passes by Qaşr Nemala, an ancient structure with Nabataean-Roman surface pottery (Frank 1934: 228). The road traveled in 1997 is very vulnerable to floods and without the help of bulldozers - a "road" may not have existed in antiquity. Musil who, in fact, does not mention it, but "ascended (on camelback) an ancient rock-cut, partly artificially built path" from Qaşr Nemala to Siq Umm al-'Alda (Musil 1908: 217). In view of the fact that he met caravans on his way, he might have traveled an important track or the caravan track between Petra, Wādī 'Arabah and further on. Frank too, noted that he was at the main route to Petra when he measured Qaşr Nemala in 1932 but had to avoid the beaten track for fear of assaults (Frank 1934: 228). "Shortness of time and physical exhaustion" prevented Glueck (1934/35: 35) from trying the same route. The Bedul of Petra/Umm Sayḥūn did not know of such a passage. But quite possibly, an NHG team had reached the other end of that passage already in 1984. Following Wādī Jabu from the Siq of Ba'ja through the Jabu plain, they arrived at an impassable abyss containing water and reminiscent of a similar obstacle in Wādī Şabra, in both cases due to the abrupt end of the Cambrian sandstone formation. At Jabu, a well-trodden path by-passes the precipice across plutonic outcrops and runs to a wide saddle. A ruined structure might have been a watch tower. The path continues from the saddle in a westerly direction (Lindner 1986: 127/8). As

8. The passage from Petra through Wādī Adulaiya to Umm Ratam was walked and surveyed by M.

Lindner, U. Hübner, I. Künne and Dakhilallah Qublan in October 1998.



8. Map of Palestine, 1:50, 000 with the passages through Wādi an-Naqab and Wādi Umm Qamar (western route) and through Wādi Adulaiya (eastern route).



9. Possibly ancient, at any rate newly repaired threshing place below Rās Adulaiya. Jabal Adulaiya back ground center.

the crow flies, Qaṣr Umm Ratam is 7.5 km, while Bīr Madhkūr is 9 km away. A traveler coming from one of these places would reach Petra by the valley of Siq Umm al-Ḥirān and Bayḍa. However, the possibility that the ancient path is hidden under the bulldozer road cannot be ruled out. "The important Petra-Gaza road that passed from al-Bayḍa to Bīr Madhkūr" is mentioned, but was not traveled by D.F. Graf (1992: 253-260). As a matter of fact, a lot of different tracks were seen, all of them negotiable on foot, by horse, camel and 4-wheel-drive.

No Main Traffic Routes

One is at a loss to define any one of the enumerated passages as "the road between Petra and Umm Ratam". At different times with different animals, different loads, different people, in different seasons, clandestinely smuggling (or openly trading), one or another passage may have been chosen.⁹ Generally, the passages between Petra and Umm Ratam were not the main traffic routes in antiquity. These are to be found in the tracks Petra - Ṣabra - Abū Khushayba - Wādī 'Arabah (Lindner and Zeitler 1997/8:

9. It has to be noted that the passages surveyed and described, even in prime condition did not allow for the use of simple carriages. People and animals had to walk in single file most of the way. Use of any passage by a military force of more than company size with the obligatory baggage train, e.g. by

563) and Petra - Wādī Naqab - Naqab ar-Rub'ai - Wādī 'Arabah. Here, the utmost was done in securing the tracks, in alleviating the route for camels and horses, and here was the better water supply. Besides, nearly all information of having been used as main passages stems from the "Ṣabra route" and the "Wādī Naqab route" (Lindner 1992b).

There is one uncertainty. As to its location and significance as a string sanctuary, the Pond Temple (Lindner and Gunsam 1995) should have had better approaches than are to be found today. In that case, the passage from Petra through aṣ-Ṣiyyagh gorge to the Pond Temple and further on to Umm Ratam would have been rather important. But, apparently not only the temple site but the whole area between Slaysil, the aṣ-Ṣiyyagh gorge and Umm Ratam was severely damaged by earthquakes in antiquity, and is still being damaged by flash floods at present. Without them, the Temple was laboriously reached by M. Lindner, but easily by U. Hübner.

The Fortification of Umm Ratam

The fortification of Umm Ratam is located on the promontory of an old terrace of alluvial sediments above the confluence of Wādī Mūsā coming from the southeast and Wādī Umm Ratam joining it from the south (Figs. 10-11). The latter is narrowed at this place by an alluvial silicated limestone range on one side and by the Qaṣr hill on the other side. The lengthy elevation of the hill seems to consist entirely of conglomerated wadi deposits.

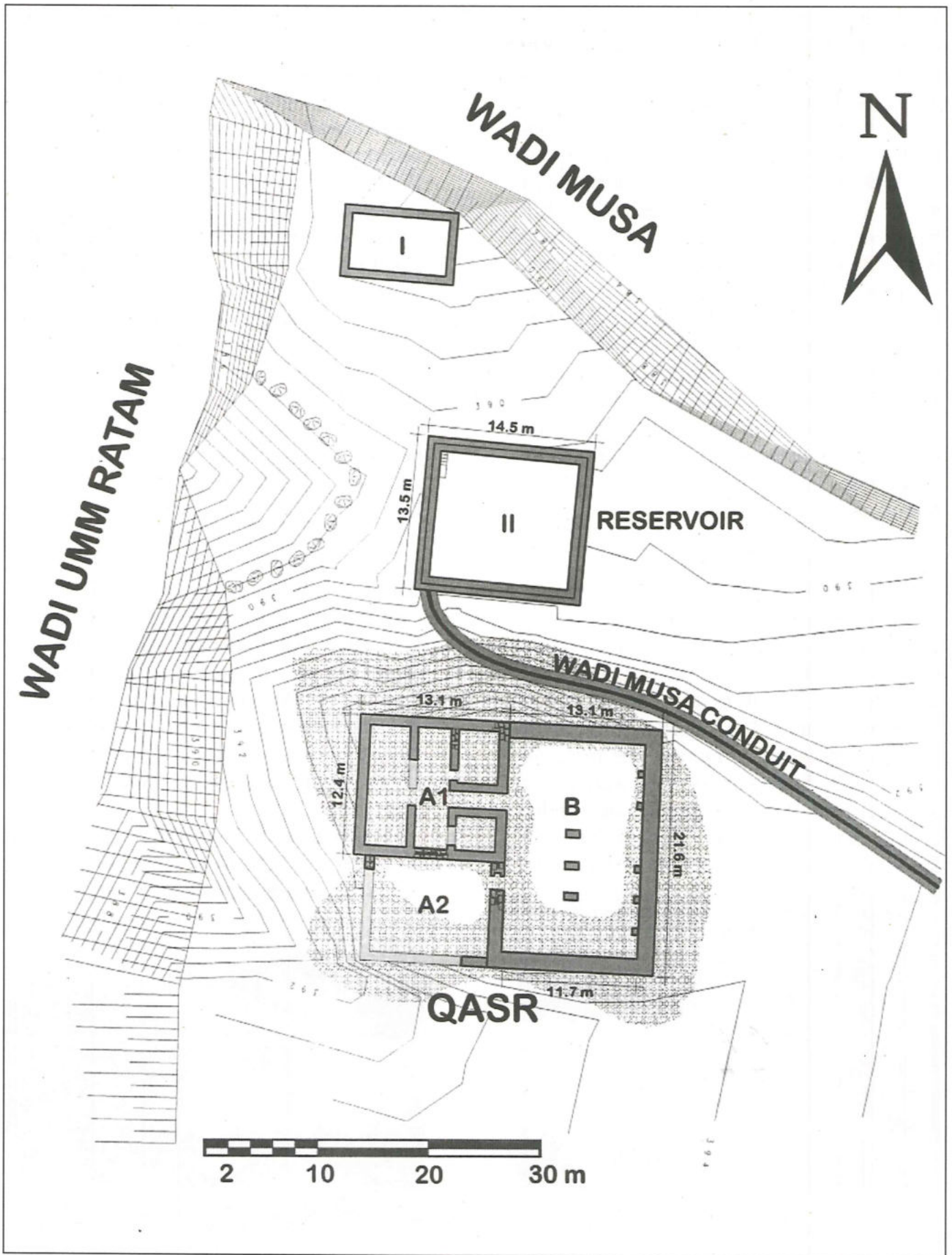
I. A Building of Unknown Significance

The fortification of Umm Ratam consists

Athenodoros or Demetrios around 312 BC was impossible. Artificial passages hewn through the rock, e.g. between Ṣabra and Abū Khushayba do allow two riders to advance abreast, but they can hardly be attributed to the end of the fourth century BC.



10. Aerial view of Qasr Umm Ratam.



11. Plotting of the fortification, 1997 (Hübl).

in one line from the north to the south first of a rectangular building(I) of 10.0 x 6.3 m at 391 m asl (Frank's measurements were 7.20 x 4.80 m with walls of 0.75 m thickness) and unknown significance. Yet it controlled visibly the confluence to both sides, the settlement and the banks to the northeast where a road or track may be supposed to have been used in antiquity as it is used now. The building stands (now) closest to a steep escarpment of conglomerate of 6 m, in Franks time 6-7 m high and seems to be the most endangered part by floods of the whole hill. Whether more buildings had been standing in that part is not known. Some might have been destroyed by the lateral erosion of Wādī Mūsā. A rectangle nearby was cleared of debris and used as a field by Bedouins.

II. The Reservoir (Fig. 12)

14 m somewhat to the southeast with its walls fairly parallel to the ones of Building I, the reservoir (II) of the fortification measures 14.5 x 13.5 m on its surface. There are steps leading down to the bottom in the northeast corner. The interior walls show remnants of hydraulic mortar. The reservoir is at least 2.35 m deep; its walls were raised at a later time. The conduit (see later) ended in the southwest corner. Filled to the upper layer of stones the reservoir would have



12. Reservoir of Qaşr Umm Ratam with the expedition's camp and the settlement to the upper right. Ashlars in foreground belong to a later raising of the reservoir walls.

held ca. 330 m³ or 330, 000 litres of water.

III. The Qaşr (Fig. 13)

The main structure of the fortification of Umm Ratam, the Qaşr Umm Ratam (III) (or sometimes Qaşr Wādī Mūsā according to Frank), with its walls again fairly parallel to the longer walls of structures I and II, is situated a couple of metres higher up at 394 m. The Qaşr measures a total of 25.6 (26.2 in the north) x 21.6 m (240 m²) and is built of well-cut ashlars of a hard sandstone obviously quarried farther south.

Due to the different thickness of the walls and their quality, two different parts of the Qaşr can be recognized: One part with thinner and better laid walls to the west (A1, A2) and another part (B) with thicker and less sophisticated walls to the east. Between the two parts there existed once an entrance or a gate. It may be presumed that the western part is the more ancient one. Due to an earthquake (or several of them), the walls of the eastern part were thrown to the east of B. As far as tumbled masonry allows inspection, a basement may be supposed. A division into several rooms is visible in A1 (12.4 x 11.2 m); A2, less filled with tumbled stones might have been a kind of fortified courtyard.

The walls of B were added to A1 and A2 at a later time. There was either a shortage of skilled masons or the work was done in



13. Older Part of Qaşr Umm Ratam with bossed cornerstones and a crenel.

haste. Whereas the ashlar of A1 and 2 are well-cut and well-laid with the cornerstones bossed in the centre of a nice frame, the ashlar of B show no bossing, and are less carefully cut and less carefully laid. The differentiation “earlier and later” is marred by the fact that crenels are to be observed exactly where the building is supposed to be older. Thus, a later origin could be suggested by A. Alt. He even ventured to think of the Crusaders who at the time were interested in roads (and fortifications) at ‘Arabah (Alt 1935: 50/51) and - chronologically - might have used crossbows.

The Qaşr surface revealed little pottery. After all, the King expedition had admittedly taken 405 sherds with one (!) Nabataean body sherd and a significant preponderance of Roman-Nabataean and especially Roman-Byzantine ware, whereas at the settlement only 207 sherds were collected (King *et al.* 1989: 212).

The Settlement

The settlement on the left bank of Wādī Umm Ratam extends as far as determinable to approximately 30 x 30 m. It is located on top of a mound of hardened wadi deposits which, in the course of time, were probably many times first accumulated and then taken off by floods in the wadi as it is the case right now. Solitary, rounded, up to man-sized boulders of volcanic rock (porphyry ?) are to be found, e.g. in the middle of the settlement as well as on the upper slopes. Behind the settlement, the site rises to a steep limestone hill. There, a ruined (watch-) tower was seen on top, and 10 m farther down, the ruin of a house with a view toward the west. Further up Wādī Umm Ratam, on top of a ragged ridge of silicated alluvial limestone, a few roughly worked stones of a small house or shelter and several un-

intelligible scratches are reminiscent of people watching over the area for animals or adversaries. The settlement itself was by its location defensible and safe from flash floods. Part of it was lately cleared by Bedouins in order to gain a small field for planting. The surface is pockmarked with illegally dug holes of different depths. After a level stretch between the settlement and the aforementioned limestone hill the mountainside is hollowed out to form a rock shelter. Supposedly the stones for building the settlement were quarried here, whereas the Qaşr was built of sandstone. A separate structure of 15 x 8 m in front of the rock shelter was built of roughly hewn limestone ashlar of up to 0.40 x 0.80 m. A threshold stone still lying in the entrance to the ruined building was made of a finely worked white material and prepared to hold and block a folding door. Whether *khān*, pen or anything else is unclear without excavation (Fig. 14).

The surface of the highly disturbed site revealed a lot of pottery fragments, in fact such a large amount that the former existence of a kiln was discussed, though not attested by misfires. The pottery allows a dating of the first occupation by Nabataeans since 50 BC through plain ware, and since 20 BC through painted ware¹⁰ (cf. A. Big-



14. Entrance with a threshold of a long ruined structure of unknown significance.

10. A. Alt (1935: 49) suggested the Nabataean kings might have taken into possession agricultural territories in the ‘Arabah and have them worked by their own people or by vassals. For a decision, it

was necessary to know the “Lebensdauer” of Nabataean pottery. That in the ‘Arabah such pottery would have outlived the Roman annexation of 106 AD was already attested by Glueck (1934/35).

nasca *et al.* 1996: 174).

That such relatively early ceramics are being found on the surface is due to the Bedouins' intensive digging for treasure. The fragments thrown out from an assumed Nabataean habitation level eventually cover the ground together with the later Late Roman and Byzantine material. Pottery finds virtually end with the end of the Byzantine empire. Very little later pottery was noted. It might be of interest that no grinding slabs were found; however, a large fragment of a basalt tuff mill indicates a communal flour production. Of other finds, a rolled oval picking stone of 10 cm length, probably, of porphyry does not betray the date of its use.

A Sounding in the Umm Ratam Settlement

A sounding of 3.5 x 1.50 m (1.50 m part of a wall traceable to 6.30 m) down to 1.90 m in the settlement first produced tumbled limestone ashlars mixed with ceramics of all periods of the site including glass fragments (bottoms of juglets, beaker bases?), as Glueck noted them at Bir Madhkūr (1934/35: 14, 37), with an ample amount of finely rouletted Nabataean-Roman ware as found in the theatre of Šabra (Lindner 1982: 241, Pl. LXIV, 1). Marked by a *ṭābūn*, a Late Roman-Byzantine layer followed with lots of bottles, among them a pilgrim's flask, plates and cooking pots - all of them broken - together with several decorated lamp fragments, a piece of sea shell and several malachite stones of coin size (Fig. 15). In the last layer of 0.30 m clay above bedrock were a few vessels of Nabataean style though without the technique, clay and color of the first to fourth century Petraean pottery. Among several fire places between 1.20-1.80 m, an iron nail, a juglet and a cooking pot filled with delicate bones and ashes were revealed *in situ*. In the packing of the ground floor (1.90 m) a small beige-colored Nabataean-style vase was complete when found. It may have been purposely de-



15. Sounding in the settlement: Late Roman vessels *in situ*.

posited. In the Late Roman layer, a coin of Galerius as "Caesar" (293-305 AD) minted in Alexandria, and a second less readable, from the late third or early fourth cent. AD dated the layer to that or to a later period (U. Hübner after Sutherland 1967: 667, No. 48).

Other Habitats at Umm Ratam

The traces of walls of two or three houses and household ashes in the ground were noted at a spot ca. 500 m to the WNW of the Qaṣr on the right side of Wādī Mūsā. At the foot of a steep slope, a big *Acacia raddiana* marks a Nabataean-Roman site with ceramics from the first century/BC to the second/third century AD. The houses may have been torn away by an extraordinary high flood.

During a survey of the east, a tower (*fort?*) of ca. 6 x 5 m ca. 1 km EEN distant from Qaṣr Umm Ratam and to the north of Wādī Mūsā was discovered on a steep cone-shaped hill overlooking and dominating Wādī Mūsā, the conduit toward south, the Qaṣr and the "gardens" beyond it (Fig. 16). The defensible structure, named "Uli's tower" and revisited in 1998, is built of large sandstone ashlars and seems to contain abutments for arches of a basement. It was found illegally excavated to a considerable depth, and a lot of pottery fragments ranging from exquisitely painted Nabataean to rough household and storage ware were spread out



16. "Uli's Tower" a fort guarding the access to Umm Ratam and a terraced wadi system.

on the surface.¹¹ Aside from its role as a watch-tower at the entrance to Umm Ratam, and a dwelling, it controlled a terraced wadi, i.e. a wide wadi crossed by terrace walls for slowing down winterly run-off and saturating the soil behind each terrace. Of the fields gained that way, one had been recently cultivated by Bedouins.¹²

Traces of Pre-Nabataean Occupants or Settlers

No Iron II (Edomite) sherds were found in the examined area. However, somewhat

more than 1 km to the EEN of the Qaşr, at the foot of a rocky hill above the right bank of Wādi Mūsā, PPNB lithics with a high percentage of fan-like flakes spread under and below a wind-blown, red sandstone rock shelter open toward EES, were discovered by U. Hübner. It provided, if not habitation space, certainly protection against sun, wind and rain for a *Homo sapiens* population who profited from an unobstructed panorama over Wādi Mūsā.

Chipped lithics, implemented with the typical Levallois technique of the Middle-Paleolithic ("Mousterian") and associated usually with Neanderthal man, were collected by I. Künne in 1997 from a 50 x 50 m plutonic flat spur of Jabal Abū Şūwwāna, a little more than 1 km to the WNW of the Qaşr, a seasonal vantage point for hunters who profited from a panorama view of Wādi Mūsā and the whole of Umm Ratam. Due to their thorough patination and abrasion, specimens of coarse flake tools made from local tabular material are possibly of another period as unpatinated specimens collected at the precipice by E. Schreyer. Only a few patinated implements, but no unpatinated specimens were noted in 1998.

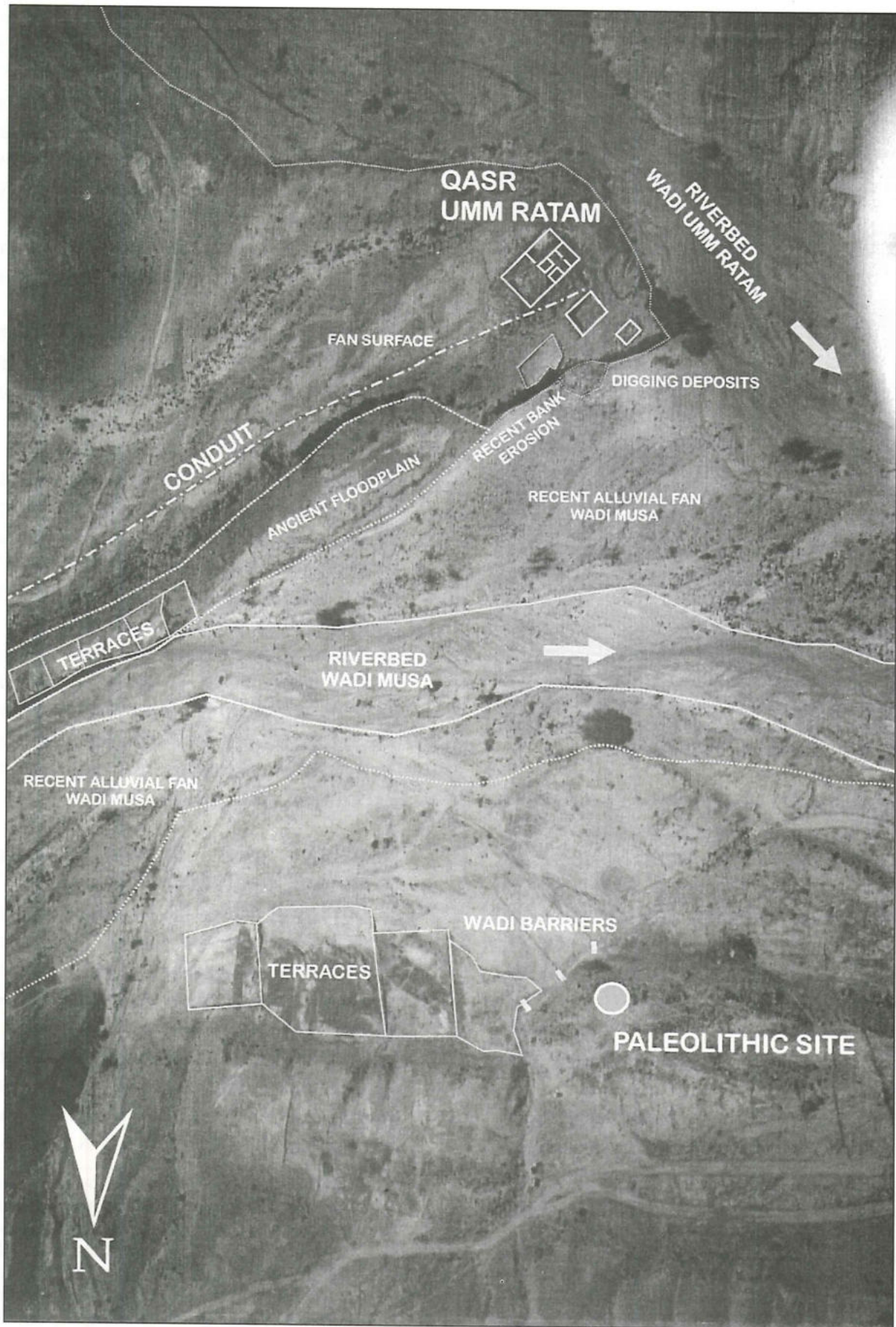
Ancient and Recent Landscape Changes North of the Qaşr (Fig. 17)

An aerial photo (M. Lindner 1995) of the banks of Wādi Mūsā shows recent erosion right by the promontory to the west and the north-east of the Qaşr. In the first case, the beginning of a ravine was obstructed by a row of fieldstones and boulders in order to gain a small field at a place where run-off water uses to flow in the line of the destroyed conduit. The erosion is, due to flash

11. The habitat to the WNW of the Qaşr and the tower 1 km EEN distant from the Qaşr were detected by U. Hübner in 1997.

12. Similarly M. Evenari: "Es ist wichtig zu betonen, dass die terrassierten Wadis auch heute noch ihre ehemalige Funktion erfüllen; denn die Beduinen benutzen manchmal nicht zerstörte Terrassen zum Anbau von Gerste, die ihr Wasser nur von

Sturzfluten bezieht". The "tower" above the wadi, also used as a watch tower or fort may have belonged to what Evenari calls (and displays in a sketch drawing) a "farm" in this case with additional channels to get as much flash flood water as possible to the fields (M. Evenari, *Ökologisch-landwirtschaftliche Forschungen im Negev*. Darmstadt 1982: 31-34).



17. Landscape changes at Umm Ratam (Hübl, Lindner).

floods, crashing into the promontory and transporting the debris further to the confluence with Wādī Umm Ratam. Being one of the reasons why the Department of Antiquities permitted and supported - by transportation - the expedition, these damages have to be taken seriously. However, they depend on the frequency and the height of the rare flash floods in the future. In the authors' opinion, an excavation within the next 20 or 50 years would not be too late.

Additionally, the aerial photo shows recent alluvial fans to the north and south of the bed of Wādī Mūsā. They contrast sharply with the quite possibly ancient terraces on floodplains and hills. A long succession of sedimentary deposits each of which in turn narrowing the bed forced the flash floods to change their paths with older or ancient terraces remaining to this day. Wadi barriers below the Paleolithic site bear witness to recent agricultural activities comparable with the newly used but originally ancient terraced wadi opposite "Uli's Tower".

The Agricultural Plains ("Gardens") at Sayl Wādī Mūsā

After the confluence of Wādī Mūsā and Wādī Umm Ratam, the bed of Wādī Mūsā widens into Sayl Wādī Mūsā, actually the beginning of its mouth (and end) in the 'Arabah. The formerly (and in some places at present) cultivated plains called "Roman Gardens" extend at the northern (right) bank of the valley. It is a little difficult to decide visually whether these plains are being irrigated by occasional floods in the wadi as Frank supposed. Frank described "überall in dem Tal... Feldgrenzen und Terrassenmauern, einmal auch eine 2 m hohe Talsperre von etwa 100 m Länge mit langsam abfallenden Staumauern, die an der Krone 2.20 m stark und im Innern mit Lehm

gefüllt war". As a matter of fact, the "Gardens" are being irrigated in the north by the run-off water from the foot hills of Jabal Abū Šūwāna (800 m) and not by the floods in the wadi. Otherwise the ancient (partly later rebuilt) cross walls dividing the plains in irrigated Gardens would have been carried away by the first flood. These cross walls or check dams built to retain the run-off water are getting higher and more solidly built the further one proceeds toward the west. In one place, the massive double wall already described by Frank crosses the plain. The soil (according to I. Künne) consists of fine-grained hardened silt which does not allow bushes to grow but is fertile after being ploughed.

Concerning the "Roman Gardens", there seems to be little truth in ascribing the better built walls to an earlier Nabataean period and the lower ones to the Roman occupancy or *vice versa*. Perhaps older and more recent cultivation or later extension or the necessity to built higher walls due to more run-off should be considered. On the right side of Wādī Mūsā, a water channel partly rock-cut, partly built was noted. It might be part of the "große Wasserumführung" mentioned by Frank (l. c. 229), probably to be explained as one of the channels destined to conduct run-off water to the fields.¹³

According to the finds of Early Nabataean pottery in the settlement, the Gardens together with the terracing cross walls were most probably Nabataean work. Beginning with the Roman occupation after 106 AD, agriculture in the neighbourhood of the Qaṣr was controlled and enforced by a Roman, respectively Byzantine military or/and civil administration. Yet, there seems to be no doubt about the continuation of Nabataean habitation at least up to the end of the Byzantine empire. As Glueck rightly stated, "the

13. Following a remark of H.J. Bruins (1986: 41) it should be investigated to what degree the hillsides above the "Gardens" were changed in an-

tiquity to increase the run-off, e.g. by removal of stones or by concentrating them in mounds and gravel strips.

Nabataeans did not disappear from off the face of the earth after being subjected by the Romans" (1934/35: 75).

On a hill above the "Gardens", the ruin of what could be called a hamlet, was found together with Nabataean-Roman pottery. The "Garden" extends here to a length of ca. 300 and a width of ca. 200 m between two strings of hills. A Bedouin graveyard is installed in its north-eastern section. By the recent (and ancient?) road, winding along the hill where the hamlet was noticed, an un-inscribed worked stone (milestone?) of 0.60 m length with a thicker base (definitely no milestone according to U. Hübner) was seen and photographed in 1995 and 1997.

The Wādī Mūsā Conduit (Fig. 18)

In 1997/98 the the Wādī Mūsā Conduit¹⁴ was several times surveyed in both directions. According to J. Hübl, its water originated at 'Ayn aṣ-Ṣiyyagh, the spring ca. 200 m to the west of the entrance of aṣ-Ṣiyyagh. Due to recurrent spates through aṣ-Ṣiyyagh gorge, as Wādī Mūsā is called where it turns into a canyon between Jabal Utud and ad-Dayr massif, only several fragments of channels were observed. Where the wādī runs north for almost 1 km before reaching the ruin field of the Pond Temple at Sahir al-Baqar, partly built, partly rock-cut channel sections were seen, obviously originally leading to the temple area and farther on. In the temple area, the Conduit was probably additionally filled from the outlet of Wādī Siq al-Ghurāb and/or from springs and ponds in the rock wall of Jabal Slaysil. One channel was observed at the foot of the steep rock wall between Rās Slaysil with the *tāhūnah* (Lindner and Gunsam 1995/b) and

Sahir al-Baqar with the ruin field of the Pond Temple. The channel is cut from the rock, and a single palmtree nearby bears witness to an occasional water supply even in these days. A Bedul Bedouin planted a small garden with olive, fig, almond and tobacco years ago, using the same ancient water supply about 50 m above the ruin field. After another 250 m, still to the east of the S-shaped bend of Wādī Mūsā, plastic hoses of local Bedouin were noted.¹⁵

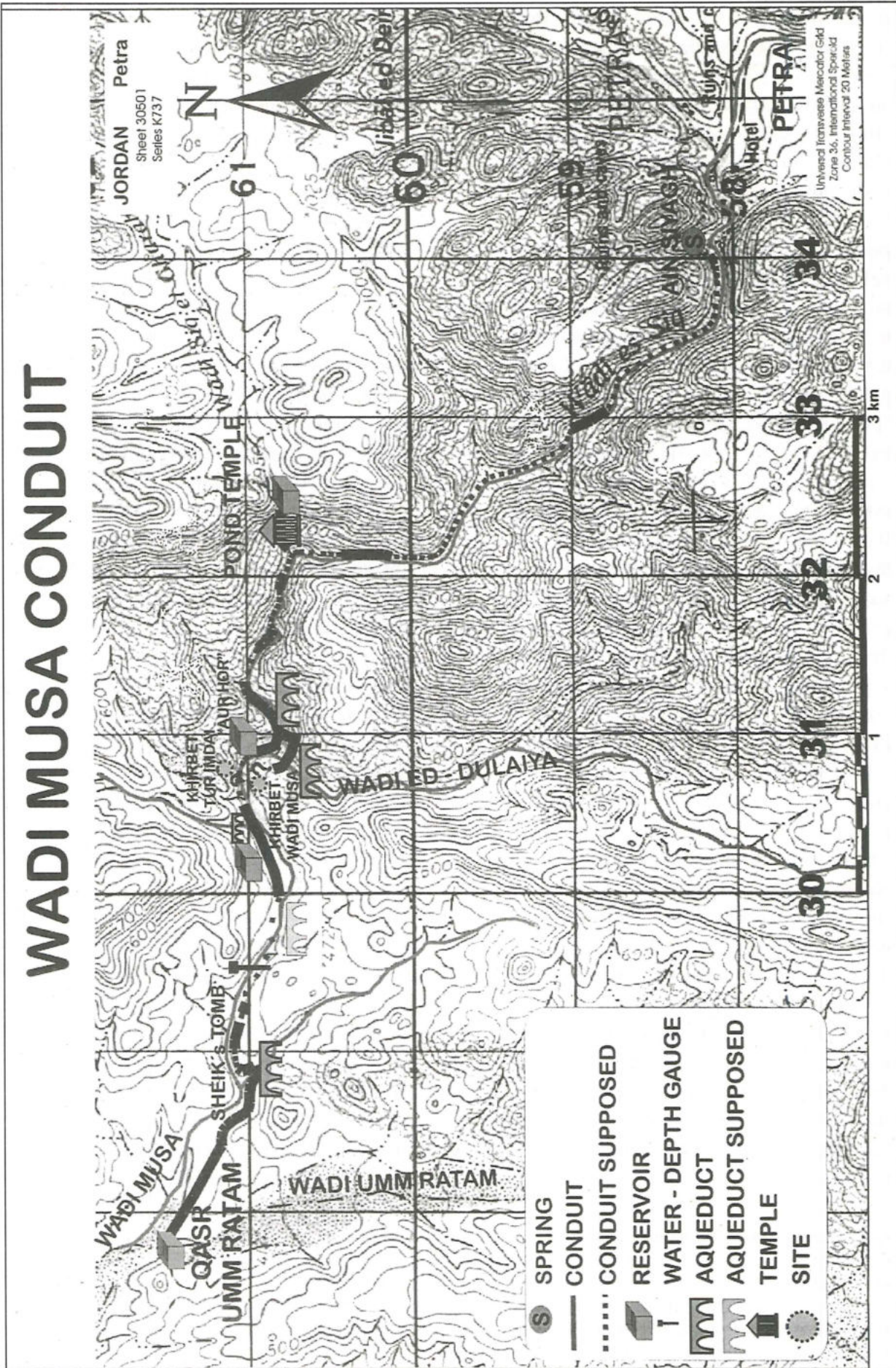
The above-mentioned channel must have crossed the steep slope above the Pond Temple, but could not be followed due to the obstacle of the thickly overgrown gorge into which Wādī Mūsā changes after leaving the Pond Temple area. Only a few traces of channel substructions were noted.

As a well-preserved channel, the Conduit then enters the S-bend of Wādī Mūsā and runs below the 160 x 20 m plain of "Aur Hor" (according to Dakhilallah Qublan) on the right wādī bank till it reaches the abutment of an aqueduct bridge (1) carrying it to the left (southern) wādī bank. Climbing up the rocky slope by the abutment (1.50 m wide) on the southern slope, the plain of Aur Hor shows a massive substruction with the ruins of two buildings (5 x 3 m) and two more farther up the plain toward the summit. The location of the installation "Khirbat Wādī Mūsā" (as proposed by U. Hübner) points to a purpose of controlling and repairing the channel in an especially important section. Another branch of the conduit was traced on the right bank of Wādī Mūsā, where it filled a cistern of 4 x 4 m, excellently built with large ashlar. Two layers are still preserved on three sides. The reservoir seems to have had an outlet to the

14. The description of the Wādī Mūsā Conduit is based on joint efforts of all members of the Umm Ratam surveys over a period of several years. The final plotting was done by J. Hübl and H. Gruber, both of the University of Bodenkultur Wien, Austria.

15. The Bedouin of the Umm Ratam area were plant-

ing gardens (fruit and olives) around the confluence of Wādī Mūsā and Wādī Adulaiya in 1997 and 1998. They had water brought to them by plastic hoses. Where they needed water they punctured the hose and closed it afterwards with some piece of a discarded garment in a makeshift fashion losing that way a lot of water.



18. The Wādī Mūsā Conduit leading to Umm Ratam (Hübl).

west. At the foothills of Jabal Utud, the channel crossed Wādī Adulaiya on an aqueduct bridge (2) after a change of again 90°. Abutment ashlar of this aqueduct are still *in situ* on the left slope of Wādī Adulaiya. Running along the rock walls the channel of the Conduit remains on the left side of Wādī Mūsā.

The purpose of both aqueduct bridges is not entirely clear. There may have been an additional flow of water from 'Wādī Adulaiya or "Khirbat Tur Imdai" (as proposed by U. Hübner) to be supplied from the Conduit (Fig. 19). At any rate, ca. 500 m to the west of Tur Imdai, a cistern of 6 x 4 m was noted on the right bank of Wādī Mūsā which is (according to J. Hübl) clearly connected with the Conduit, despite the fact that due to its location at the outside curve of Wādī Mūsā the channel section between Tur Imdai and this cistern has been eroded away. After Tur Imdai, a tributary had to be crossed by another aqueduct bridge (3). After the crossing ca. 25 m of the built channel are well preserved. Here, too, a cistern is included in the Conduit. Before Wādī Mūsā narrows into a gorge with an old and new water-gauge, the conduit on another aqueduct (4) crossed to the left side of Wādī Mūsā. Of the aqueduct no remnants were found, however, several sections of a built channel are recognizable. By a Bedouin cemetery with a particular ash-shaykh's tomb, the channel crossed another tributary coming from Jabal Qamar in the south. The abutments of the aqueduct (5) are well preserved on both banks (Figs. 20-21).

The following section is a channel affixed to the rocky left bank (Fig. 22). Finally the Conduit, as a well-built channel with ashlar to both sides runs down the eroded,

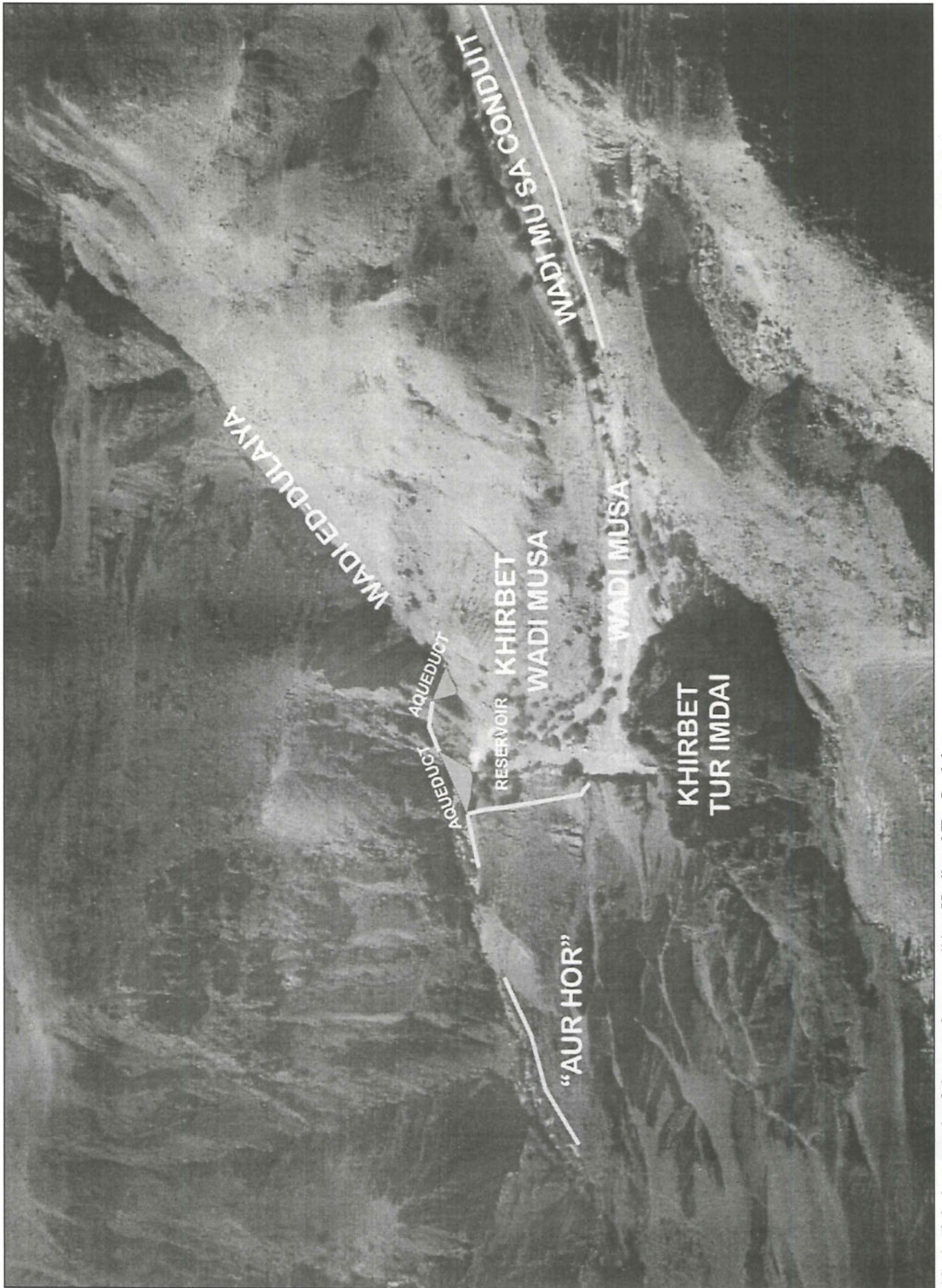
slightly sloping plain toward Qaṣr Umm Ratam (Fig. 23). It ends after ca. 800 m in the south-western corner of the reservoir. Previously, this last section was provided with ceramic pipes, fragments of which were found in the plaster bed and between the ashlar.

The Wādī Mūsā Conduit was an integral component of the fortification of the Qaṣr at Umm Ratam. However, as ingeniously as it was planned and executed, as vulnerable it was. Recurrent flash floods, earthquakes and neglect endangered the water supply of Umm Ratam. The weakest points were the five aqueducts, masonry walls of 1.50 m width with one or several arches, spanning more than 15 - 25 m approximately.¹⁶

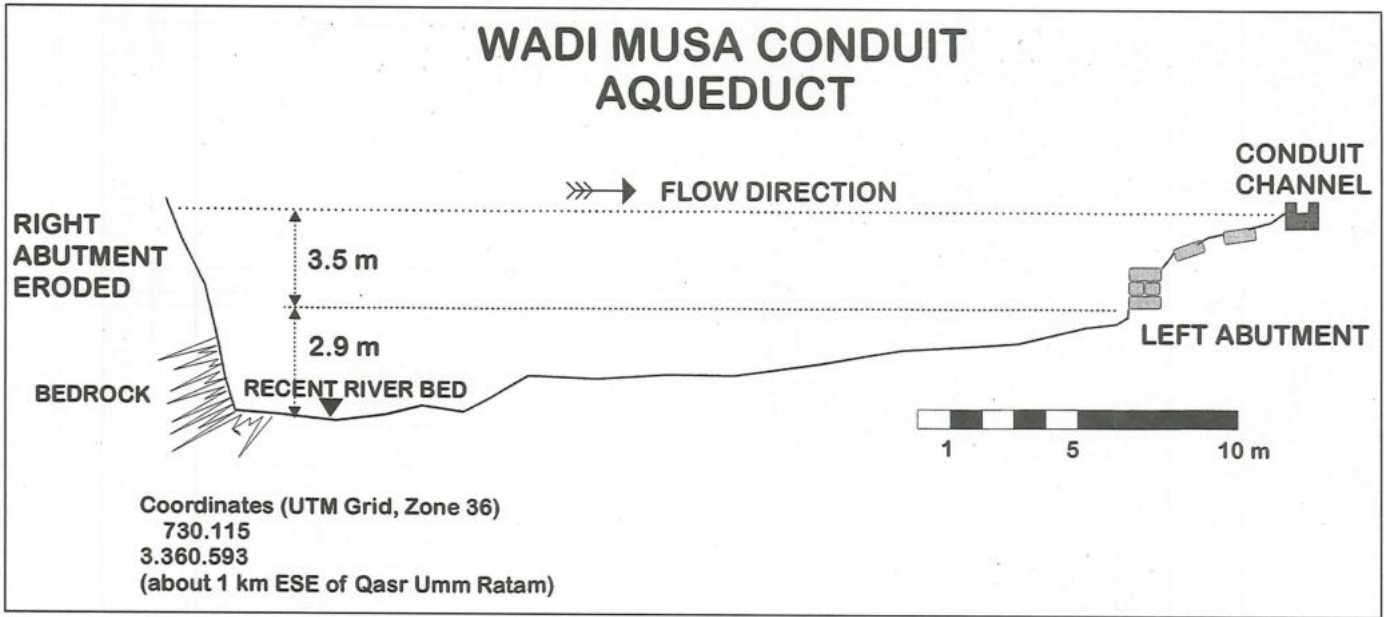
The size (and subsequent enlargement by raising the walls) of the reservoir at Umm Ratam indicates an urgent need of more stored water, probably due to an irregular supply through the Conduit. Observations concerning the tumbling of ashlar of the Qaṣr and the 15 x 8 m structure are reminiscent of earthquakes most probably also affecting the Wādī Mūsā Conduit. The replacement of excellent ceramic pipes with a simple plaster bed into which fragments of pipes were integrated for strengthening, was the result of earthquakes or, less plausibly, destruction by enemies or the lack of new pipes. Imagining the complicated, sometimes almost haphazard construction of the Conduit, people experienced in building, stone-cutting and repairing had to watch and be ready for repair work. Quite probably, the villages and hamlets of the surrounding area had to provide skilled workers for securing the Conduit. The Conduit was to be filled at different levels and it is to be doubted that there was one single influx prepared.

16. Compared with the lean-to aqueduct arches of es-Sadeh (5.00 m high, 3.50 m long, 0.80 m wide) (Lindner *et al.* 1990: 216), those across Wādī Mūsā were according to their abutments of 1.50 m width considerably stronger. Musil (1908: 40) estimated the span of the aqueduct in the North-

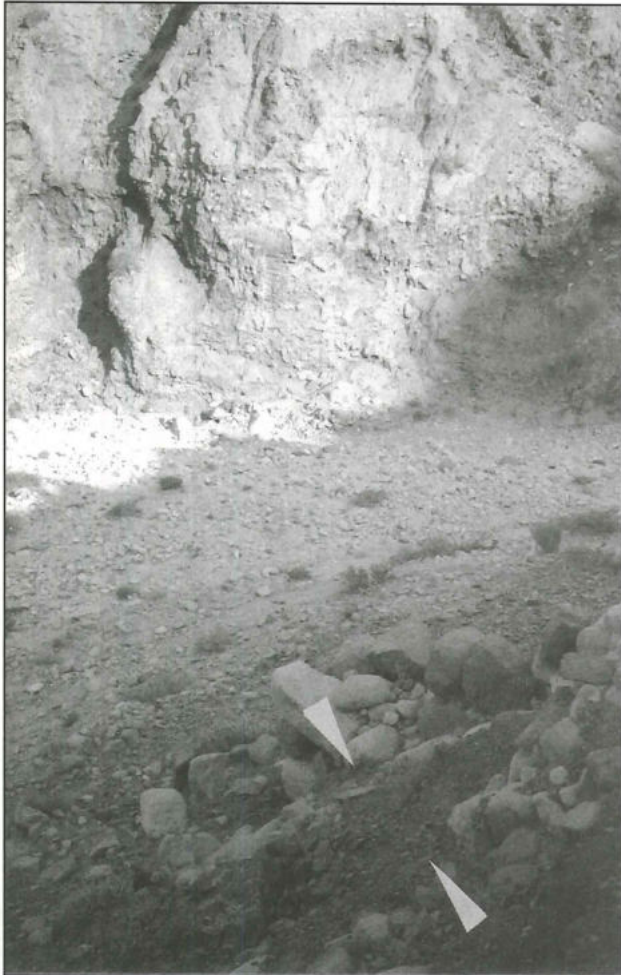
ern Hubta Conduit as 5-6 metres, certainly a width not sufficient to cross Wādī Mūsā or Wādī Adulaiya with a single arch. In Faynān he estimated more than four arches in an aqueduct bridge of ca. 140 m length (Musil 1907: 292).



19. Aerial photograph of the area between "Aur Hor" and Tur Imdai.



20. Wādi Mūsā Conduit aqueduct bridge (Hübl).



21. Abutment of aqueduct bridge (right).

In case of flash floods, possible influxes had even to be blocked or diverted in order to save the Conduit.



22. Rock-cut and built Conduit at the southern cliff of Wādi Mūsā.

Details of Wādi Mūsā Conduit

From 'Ayn aş-Şiyyagh to Umm Ratam

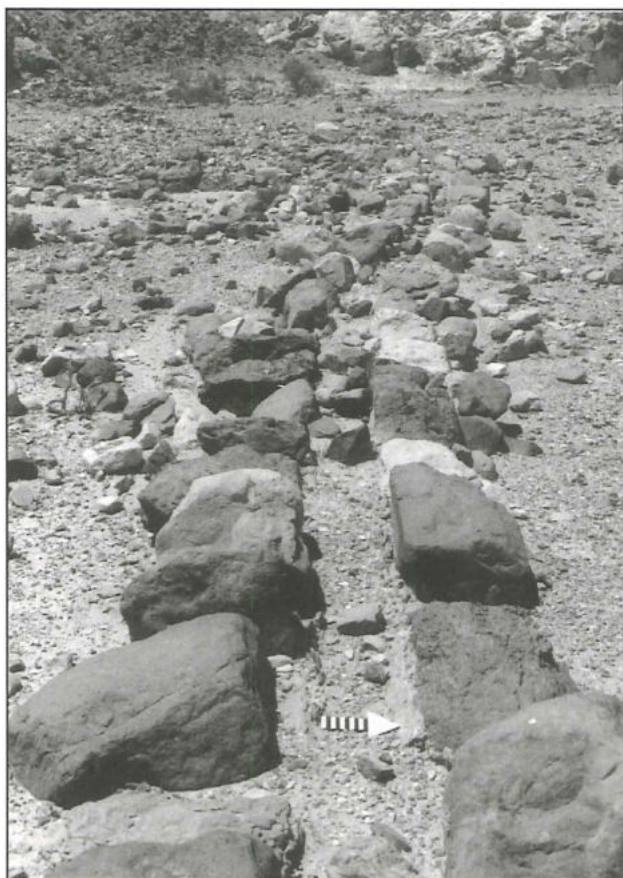
| | |
|----------------------------|--------|
| Total length: | 9.3 km |
| Total altitude difference: | 440 m |
| Average incline: | 5% |

From 'Ayn aş-Şiyyagh to the Pond Temple

| | |
|----------------------------|--------|
| Length: | 3.9 km |
| Total altitude difference: | 240 m |
| Average incline: | 6% |

From the Pond Temple to Umm Ratam

| | |
|----------------------------|--------|
| Length: | 5.4 km |
| Total altitude difference: | 200 m |
| Average incline: | 4% |

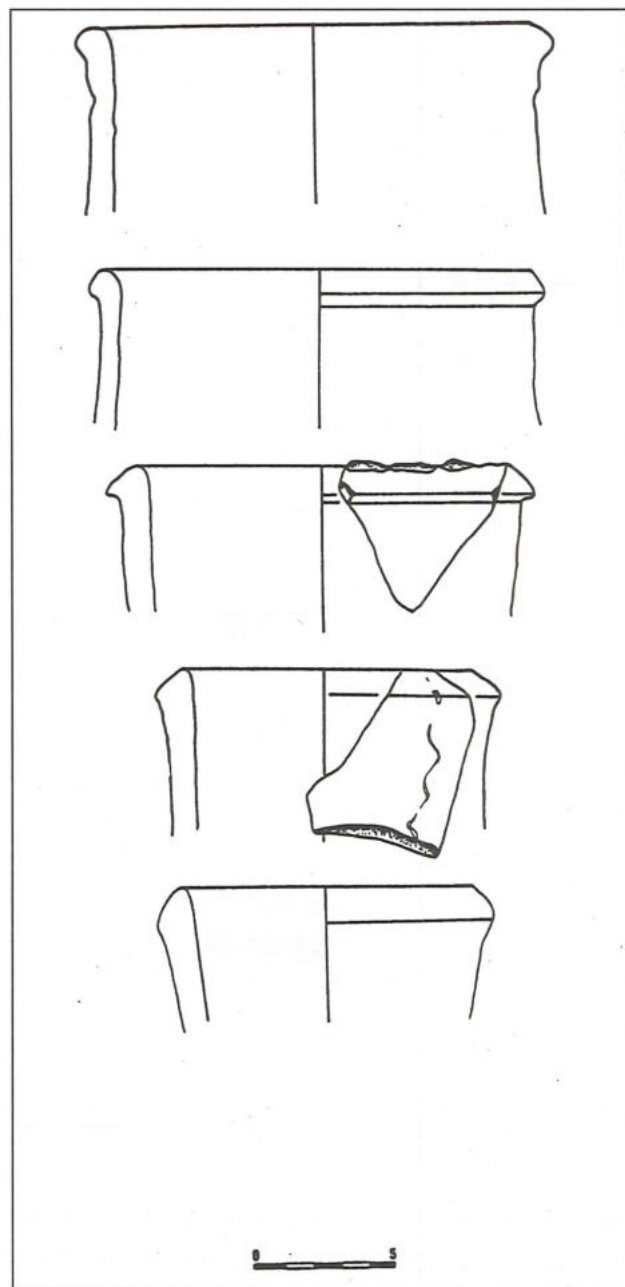


23. Wādī Mūsā Conduit with channel of 0.30 m width approaching the Qaşr

Clay pipes from the Final Section of Wādī Mūsā Conduit (M. Lindner) (Figs. 24-25)

22 openings of wheel-turned clay pipes from the final section of Wādī Mūsā Conduit were collected. The clay is well fired, from fine to coarse; the interiors and mostly the visible exteriors show broad bulges. The color is beige to buff, brick-red and dark grey; the latter color is shown by 5 sherds. The openings are 14.6 - 9.6 cm at their least internal diameter. There are two types of rims: Type I is everted, and Type II is T-shaped. 4 specimens of the collection with the least internal width belong to the latter type. Below the rims the openings are 0.4 - 0.8 cm thick.

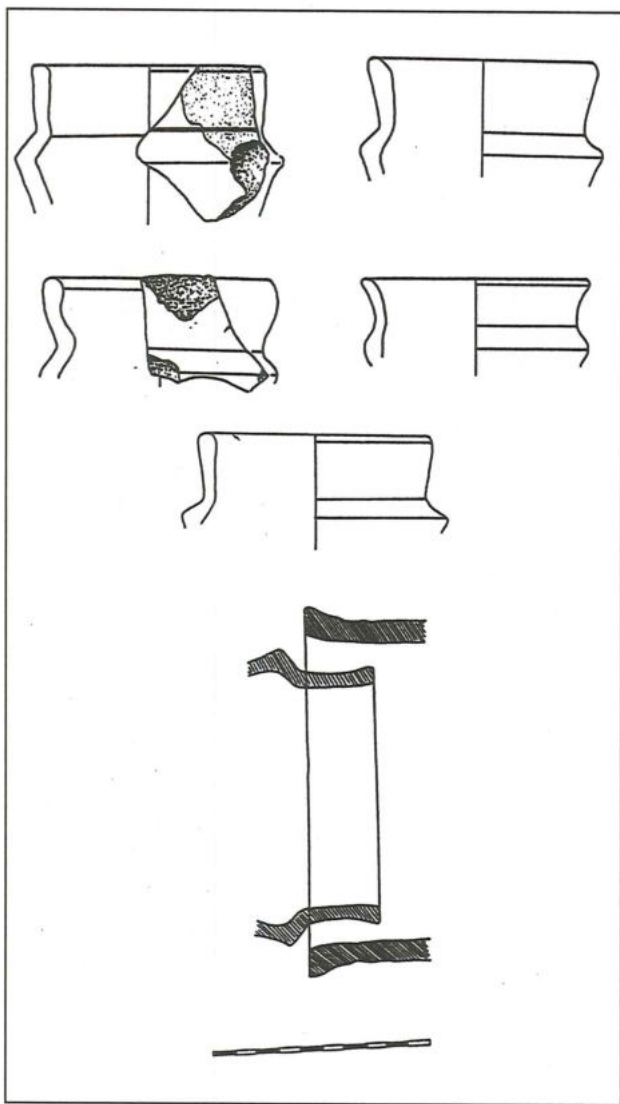
9 stepped ends of pipes were collected. Clay and manufacture are the same as those described for the openings. 5 ends are coated with a white material-probably unslaked lime - adhering to the exterior or the interior



24. Clay pipe fragments from Wādī Mūsā Conduit (Lindner).

surface. All ends have an exterior diameter of accurately 10.4 cm at the widest circumference and are 0.5 - 1.0 cm thick. According to clay and manufacture, 3 ends correspond to medium to fine Nabataean-Roman household ceramics. Several rims of the ends are purposely roughened by the potter, possibly in order to keep the filling material better adhered.

Of 5 body fragments of pipes with sizes of 7x7 to 11x13 cm the measurable exterior diameters are 12.0 - 14.0 cm with a thick-



25. Clay pipe fragments from the Wādī Mūsā Conduit (Lindner).

ness of 0.4 - 1.0 cm. One fragment found in the same area is not a pipe at all, but part of the filling of a pipe of ca. 15.0 cm width, modeling the interior structure of the bulges. The filling consists of a mixture of accumulated debris of limestone, sand, small stones and (probably) hardened slaked lime.

The exact length of the pipes could not be ascertained from the collected fragments. According to Dalman (1912: 18), the clay pipes in the Siq of Petra are 43-45 cm long (verified in 1999), with a diameter of 15-16 cm but according to Musil (1907: 73), they are 30 cm with a diameter of 8 cm. Ceramic

pipes of 43-51 cm length were found at the second/first century BC palace of Johannes Hyrkanos I near Jericho (Netzer 1999: 8). Clay pipe openings at Gadara (Umm Qays) were 11.5 cm, (Kerner *et al.* 1997: 268). Vitruvius prescribed pipes made of a tightly packed clay “ne minus duorum digitorum” (2 Zoll = 3.7 cm). The joints should be filled with “calce vita ex oleo substrata” (with unslaked lime folded in oil) (Vitruv 1976: 396/7; Irmischer 1997: 607; Landels 1979: 54). It seems the manufacture of the pipes of Wādī Mūsā Conduit follows Vitruv’s prescription of “tubuli fictiles” and is the same as of the pipes of the Siq Conduit at Petra. According to clay and manufacture, the pipes were not fabricated by the same workshop, not at the same time, and not from the same clay. From clay and manufacture it cannot be decided whether they were produced before or after the annexation of Nabataea by the Romans in 106 AD. There is an interesting detail: one opening bears a mark looking like a snake.¹⁷

Umm Ratam and Khirbat aṭ-Ṭilāḥ

The combination of a settlement with cultivated fields (“gardens”), water supply/storage and some kind of fortification at Umm Ratam is not unique in the ‘Arabah. About 50 km to the north at Khirbat aṭ-Ṭilāḥ a similar system was explored and described by Musil (1908: 209-214), Frank (1934: 213-215) and Glueck (1934/35: 12-17). There is, however, a significant difference between the two sites: At aṭ-Ṭilāḥ, a spring (‘Ayn aṭ-Ṭilāḥ) provided drinking water over a conduit of only 1 km length. and allowed even the irrigation of fields with a “spreading system of irrigation ditches in the rectangular fields with carefully built stone walls” (Glueck 1934/35: 13). At Umm Ratam, not blessed with a spring nearby, water had to be conducted from the aṣ-

17. The author tried to contact the archaeological team excavating the Siq conduits at Petra. Un-

fortunately no information was received.

Şiyyagh gorge, more than 9 km of an extremely difficult terrain without the possibility to irrigate fields. Also due to the spring, aṭ-Ṭilāḥ was able to supply traders and soldiers in a large caravanserai, at the same time a fortress. Still in 1934, it was a “cross-roads of caravan traffic” (idem p.16). Umm Ratam, with its limited water supply, could not be an efficient caravan station. Significantly, its reservoir (13.5 x 14.5 m) was far smaller than the one of aṭ-Ṭilāḥ (34 x 33 m). Though, if Glueck and the testimony of pottery at Umm Ratam were to be believed, both sites were used and probably inhabited as early as in the first century. BC, i.e. long before the Romans could have had a military post installed. The question arises: Had already the Nabataeans of the first cent. BC and the first cent. AD built the (a) conduit to Umm Ratam? If not, how did they survive? Did they rely on the large covered cistern profiting from the run-off water of an extended plain discovered in 1998 on the left bank of Wādī Mūsā for supplying caravans on the way to Umm Ratam and further on? Or, was there a Nabataean military post from the beginning, necessarily equipped with a conduit and taken over by the Roman military administration after 106 AD? Another explanation is more plausible: In the beginning, Umm Ratam with scarce architecture was only visited for seasonal sowing and harvesting, with camels and donkeys hauling large skins of water, while the people lived, e.g. at Bir Madhkūr where a spring provided water all the time and where Frank (1934: 228) also noted “eine alte Felddereinteilung mit ...Terrassenmauern” . With the Roman military presence, the small settlement was extended and served as part of the fortification of Umm Ratam, at any rate retaining people, pottery and traditions of Nabataea for a long time.

The Present Umm Ratam

Concerning the Bedouin population around Umm Ratam, there are contradictory

reports. During an excursion to Umm Ratam from Bir Madhkūr, A. Schmid noted an “Amarin cemetery several hundred meters up wadi from Qasr Umm Ratam” in 1983. She learned the graves were being visited as a kind of sanctuary by Bedouins from close by and far away. Especially the grave of the ‘Amārīn ash-shaykh Salāma ‘Awaḍ, who was allegedly killed by as-Sa‘idiyyīn about 80 years ago was revered. It was protected by a built wall with an open entrance, decorated with a lot of prayer flags and is said to give protection and help to people who camp inside the wall or even stay a night there. When examined in 1997 and 1998, the site was unchanged and still receiving offerings of candles. Following Oppenheim (1943: 285-289), U. Hübner prefers to think of as-Sa‘idiyyīn cemetery.

A Bedouin woman who visited a newly dug grave told A. Schmid that her husband had been shot to death from a helicopter a few days earlier. Reporting on burials, another incident has to be mentioned. In the sand of a clearing basin of the Wādī Mūsā Conduit ca. 300 m distant from the Qasr, the skeleton of a young person buried in a crouched posture was revealed. The unusual interment might be due to a crime as well as to pure negligence. The basin is, in fact, reminiscent of a rock-cut tomb. As a possibly Islamic tomb, it was left untouched and the skeleton was reburied.

The Bedouins who celebrated a wedding in 1997 with a few Bedul from Petra partaking in the feast were (according to U. Hübner) as-Sa‘idiyyīn as in the time of F. Frank who reported that he was molested by that tribe. According to information from Dakhilallah Qublan, both tribes, as-Sa‘idiyyīn and the Bedul are living at Umm Ratam, and also the ‘Amārīn are said to move into Wādī ‘Arabah in winter. During the stays of the NHG teams, the recent population was seen herding goats, donkeys and camels, while the people lived in their black tents with the flaps up during the heat of the

day. Allegedly, the women weave and sell black tents made of goat hair. The right (traditional) size is standardized by the woman's forehead. The same business is carried on by the Bedouins of the Bedul tribe at Petra and by the aş-Sa'idiyyin at Batha. At the latter place, the narrow strips are woven on a cleaned "alley" in the open air and later sewed together to get the right size. There is agriculture at Umm Ratam, but not to be compared with the large "Gardens" installed in the past. The Bedouin use the same places and methods as in former times, i.e. either in a plot of the "Gardens" where water comes down from the hills after winter rains or in a terraced wadi. In places, the run-off water is used for irrigating small cleared areas, e.g. to both sides of the reservoir on the Qaşr hill and in the ruins of the settlement. A remarkable number of pick-up half trucks, astonishingly suitable for cross-country driving are running over new roads. Sometimes the vehicles are even more useful than a genuine landrover. With the Bedouins' cars or by government trucks, water is hauled from Bîr Madhkûr. Lately, for the irrigation of fields and getting drinking water at the same time, water is conducted through plastic hoses from Jabal Slaysil or the aş-Şiyyagh. Newly planted fruit and olive gardens were observed around Wādî Mūsā near Tur Imdai in 1997 and 1998. The Bedouin emulate ancient agriculturists who left their terraces on both sides of Wādî Mūsā.

A large (4 x 3 m) Nabataean-style cistern, originally covered with arches and coated with hydraulic mortar, was lately reused by Bedouins (Fig. 26). A modern ceramic pot (broken) was lying at the rim. The location of the reservoir on the right bank of Wādî Mūsā outside a channeling system but at the end of a catchment area points rather to an original use for caravans and residents than for irrigation. There was no rain and therefore no flood during the stay of the NHG in October 1997 and 1998. That it had rained several days before in 1997 was



26. Nabataean cistern with wide abutments for the covering arches. A water-hauling stone is in the foreground.

shown by green branches lying still a few meters above the wadi and - of a former flood - by the mummified carcass of a goat hanging in a (*ratam*) bush on the left bank of Wādî Umm Ratam. A governmental plan for damming up Wādî Mūsā beyond the Qaşr in order to store flood water for irrigation of the "gardens" was obviously canceled. Among other reasons, it seems that the underground was not solid enough to support a dam. In fact, an artificial hole in the wadi bed going down ca. 4 m had not reached bedrock.

Living near the Jordanian-Israeli border, the as-Sa'idiyyin Bedouins are being supported by the government and rewarded for their watchfulness. Some of them work at excavations around Petra and mingle freely with the sedentary Bedul of Petra - Umm Şayhûn. During the wedding ceremony in 1997 the presentation of the bride was strikingly similar to the custom of the Bedul. In both cases the bride was painted in a way that (at least for Europeans eyes) it could not be interpreted as a decoration or a brightening up of the young woman but rather as a traditional magic to avert trouble, specifically to keep off evil spirits.

Summary and Conclusions

The surveyed passages between Petra and Umm Ratam were no main arteries of commerce, but were local connections for small

parties of local people, traders and pilgrims. They played an important role in building, maintaining and repairing the Wādī Mūsā Conduit and in military traffic between Petra and Umm Ratam. The Wādī Mūsā Conduit has to be regarded as an integral component of the fortification of Umm Ratam during the Roman occupation. Its vulnerability and in parts haphazard construction, with no less than five aqueduct bridges, was described. Hamlets and villages probably housed the people who had to supervise the Conduit. A sounding in the settlement of Umm Ratam did not with certainty verify the Nabataean occupancy by architecture in the first centuries BC and AC which was documented by surface finds. However, the Roman period of the late third to early fourth century AD was proved by coins and pottery. A fort and a habitat by Wādī Mūsā may, by their surface pottery, indicate their origin in the Nabataean pre-Roman period.

Earlier occupants were Neolithic and Middle-Paleolithic people who may have profited from a less devastated land. Ancient and recent changes of Umm Ratam were revealed by aerial photographs. They document a long succession of changes through the workings of flash floods in the valley of Wādī Mūsā. "Roman Gardens" were irrigated by run-off water of winter rains and not by the wadi flood. Properly worked (which they are not at present), they allowed for good crops if and when it rained in winter.

Pipes of a previous lining of the final section of the Conduit were described. A comparison with newly excavated pipes in the Siq of Petra is expected. At Umm Ratam it was not possible to date them precisely.

A comparison with Khirbat aṭ-Ṭilāḥ, 50 km to the north of Umm Ratam, shows grave differences, especially concerning the provision of drinking water. The present Umm Ratam is marked by the same insufficiency allowing water only for a small number of nomadic families. That state

probably exists since the fall of the Roman-Byzantine empire.

Not contradicting the general assessment of the Roman forts in the eastern Wādī 'Arabah by S. Parker, the significance of Qaṣr Umm Ratam must neither be over- nor underrated. The fort was one of many others in the historical region of Wādī 'Arabah with the special purpose to dominate and control a defined local part of it. Its main function was logistics and administration of the copper mining activities in the south-west, e.g. in Wādī Abū Khusayiba (Kind 1965: 56-73; Lindner 1992: 263-268; Gunsam 1997: 35-40). Malachite stones, observed in Wādī Mūsā during the excavation, bear witness to that task. The mining being a state affair, the Roman army had to look for organization and transportation. At the same time, local and regional security had to be maintained. Without precisely separating military and civil administration, the Roman army had additional obligations: control of the indigenous population; collection of taxes from limitanei and civilians; deployment of workers for hydraulic and agricultural installations; control of the lucrative north-south trade between the Red Sea and the Dead Sea, concerning copper, maritime trade imports, mineral salts and asphalt from the Dead Sea (Mildenberg 1996: 55 - 65), and the west-east trade from the Mediterranean, from the Negev and Sinai, from the Edomite Plateau and over the "Incense Road".

That an ancient name of Qaṣr Umm Ratam has not been handed down, is hardly an accident. As to the size (and provision with water ?) the fort ranged at the lower end of the hierarchy of similar Roman-Byzantine structures, e.g., aṭ-Ṭilāḥ and Bir Madhkūr, and not more than an auxiliary unit of cohorts or maximally, perhaps at times, a centuria may have been stationed there (U. Hübner). The settlement during this time may be regarded as the "vicus" of the Qaṣr like at other Roman "castella".

Archaeologically, one has to admit that

there are several still unclear points. The pottery and coin finds of the sounding in the settlement which at that time should have belonged to the fort in one or other way points to an origin of the Qaşr toward the end of the third century AD. Surface finds in the Qaşr area show two peaks, one in the Roman-Nabataean period and a second in the Roman-Byzantine period (King *et al.* 1989: 212). The older part of the Qaşr could easily be identified with the use (or find) of Roman-Nabataean pottery finds; the modification of the building by adding a kind of courtyard may have occurred in the Roman-Byzantine period. However, do the crenels of the older part fit in a second-third century structure?

The conclusions concerning the origin of the fortification of Umm Ratam will therefore be preliminary and are open to correction should it ever be possible to excavate the Qaşr hill. It seems that there was first a Nabataean "agricultural station" on the bank of Wādī Umm Ratam at about the same time the Nabataeans settled at (late Roman) Ayla (S. Parker 1998: 389). The same earlier origin may be attributed to ruined habitats on the right bank of Wādī Mūsā. The enlargement of the Qaşr with good intentions but bad masonry could apply to the Byzantine period when according to Z. Fierma (1992: 329), the extension into marginal lands did coincide with a decreasing significance of southern Jordan since the third century. The large structure between the settlement and the rock wall behind it remains unidentified without excavation. It might have been almost anything, but judging from a threshold for a folding door, it should have been important. Generally, the Umm Ratam area calls for another archaeological expedition relying now on a lot of preliminary work and continuing work on

the described uncertainties.

No reliable traces of an Early Islamic occupation by pottery-using people were found at Umm Ratam. Deprived of the military support and the Conduit, the Nabataeans, if they were still to be called that proud name, probably left the now forlorn place and either emigrated to more centrally located villages or became what the present population of Umm Ratam is, namely a few families of more or less sedentarized nomads. Apparently the desolate state of Umm Ratam remained the same over the following centuries. Even the rough village pottery found since the twelfth century in the outskirts of Petra is virtually lacking. Either due to technical or financial difficulties, a recent plan to build a dam across Sayl Wādī Mūsā in order to catch and store the water of the rare but plentiful flash floods was abandoned. Indications of the project are two water gauges in Wādī Mūsā and a ca. 4 m deep hole in the wadi deposits to the west of the Qaşr where no bedrock was reached. Until now, Umm Ratam is still roamed by half-sedentary members of the as-Sa'idiyyīn, Bedul and 'Amārīn who prefer the relative warm climate of the 'Arabah in winter to the adverse weather conditions of the Petra region.

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