

PRELIMINARY REPORT ON THE FOURTH (1985) SEASON OF PREHISTORIC AND PALAEOENVIRONMENTAL INVESTIGATIONS IN THE AZRAQ BASIN

by

A. Garrard, C. Hunt, A. Betts and B. Byrd

Introduction

Between the 20th September and 20th November 1985 the author undertook a fourth season of prehistoric and palaeo-environmental investigations in the Azraq Basin of eastern Jordan. The author is very grateful to Dr. Adnan Hadidi (Director-General of the Dept. of Antiquities) for providing the necessary permits, to the staff of the Royal Society for the Conservation of Nature for the use of their facilities at Shaumari, to the sponsoring bodies (the British Institute at Amman for Archaeology and History, the British Academy, the British Museum, the National Geographic Society and the Palestine Exploration Fund) for their funding of the project, and to the sixteen personnel who helped in the field. These included Alison Betts (London) who is studying the Neolithic artifacts, Christopher Hunt (Sheffield) who is studying the sediments and pollen, and Ghassan Ramahi who acted as Representative for the Dept. of Antiquities. Other specialists, who will be involved in later stages of processing, include Brian Byrd (Tucson) Upper & Epipalaeolithic artifacts, Lorraine Copeland (London) Lower & Middle Palaeolithic artifacts, Gordon Hillman and Susan Colledge (London) plant remains, the author and Rebecca Montague (British Institute at Amman) animal remains, Stephen Bourke (London) human remains and the Oxford Radiocarbon Laboratory.

The Azraq Project was begun in 1975 in order to investigate the history of environment, settlement and subsistence in the Jordanian Desert through the late Pleistocene and early Holocene: the time when animal and plant husbandry and sedentism was developing in western, more fertile areas.

During the first two field seasons (1975, 1982), archaeological and geological reconnaissance was conducted around

the central springs and in a range of environments in the outer tributary wadis (Garrard *et al.* 1975, 1977, 1985a, 1985b). During the third season (1984), soundings were made at five sites in the Wadi el-Jilāt, a tributary of Wadi ed-Dabi' and Qa' el-Azraq, lying 55 km. to the south-west of the Azraq oasis. The sites concerned were of late Upper Palaeolithic, Epipalaeolithic and Pre-Pottery Neolithic B date (Garrard *et al.* 1984, 1986). During the fourth season (1985), soundings were made at a further ten sites, in the Wadi el-Jilāt, and near Qasr 'Uwaynid, 'Ain el-Bayḍa and Azraq esh-Shishan in the central basin. These sites were of Lower & Middle Palaeolithic, Epipalaeolithic, Neolithic and Roman date.

At most of the sites, soundings were limited to one or two 2 × 2 m. trenches, and all the occupational deposits were coarse sieved through a 5 mm. mesh, washed in an earth flusher to remove charcoal, and then wet sieved through a 1.5 mm. sieve. This allowed the adequate collection of microlithic tools, shell and stone beads, small bone tools and microfaunal and floral remains, as well as larger artifacts and bones.

In addition to the archaeological work, Christopher Hunt undertook a geological study of the site sections and of sequences in the tributary wadis and central basin. The results of these investigations have considerably expanded and in some cases altered our understanding of the environmental history of the Basin and so I will begin by outlining these.

Results of Geological Investigations

An initial geological reconnaissance was made by Paul Harvey (Cambridge) in the 1982 season. However this was prior

to the excavation and also before the availability of large scale aerial photographs. During the 1985 season, Christopher Hunt made a more detailed study, focussing on the sections of two brine pits in the central playa (Qa' el-Azraq), on archaeological exposures in the Azraq marshes, Wadi el-'Uwaynid and in Wadi el-Jilāt, and on natural exposures in the three areas. Geological reconnaissance was also conducted in Wadis Rattama, 'Enoqiyya, Rājil, Kharraneh and Dabi', and at Qa' el-'Umari and Feidat ed-Dihikiya. Samples from all these localities were collected for sedimentological and palynological analysis.

Preliminary results indicate that the Azraq playa/ lake did not change much in area during the late Glacial and Holocene, although at times the water body was more permanent and at others more transient than at present. Our earlier suggestion that it expanded temporarily into a very large lake (Garrard *et al.* 1984, 1985a, b), appears to be incorrect. What had been interpreted as lacustrine limestones and evaporites during the 1982 seasons, have now been identified as carbonate and gypsum caliches. These would have precipitated out in the upper sediment horizons as a result of leaching and evaporation under arid conditions.

The overall environmental chronology for the late Glacial and Holocene now seems to be as follows: During a phase of the Upper Palaeolithic, soils formed in various localities in the Basin. The site of Jilāt 9, with a C14 date of $21,150 \pm 400$ b.p. (OxA 519), is located on the surface of such a soil. There was possibly a subsequent arid phase during which aeolian silts collected in Wadis Jilāt, Kharraneh and 'Uwaynid. This period seems likely to have coincided with the Glacial maximum in Europe, but the only site we have found which may date to this period is Azraq 17 in the central marshes. During a later period, there appears to have been a renewed phase of soil formation with widespread probably steppic vegetation. A number of Epipalaeolithic sites have been sounded which are stratified in this soil, including 'Uwaynid 14 and 18 and the first two

phases of Jilāt 6 (we await C14 dates from these sites). Subsequently, and certainly by the late Epipalaeolithic of Azraq 18 and the upper phase of Jilāt 6 (post 12,000 b.p.), there was renewed dessication. By the Neolithic, as is represented at Jilāt 7, 23, 24 and Azraq 30, 31 (post 9,000 b.p), climatic conditions had become similar to those of today, although vegetation has considerably degraded since that time as a result of over-grazing and ploughing in marginal areas.

Results of Excavations

Soundings were made at ten sites during the 1985 season; at C Spring or Azraq 21 (late Lower or early Middle Palaeolithic), Azraq 17 (Early Epipalaeolithic), 'Uwaynid 14, 18 (mid-Epipalaeolithic), Azraq 18 (late Epipalaeolithic), Azraq 31 (late Pre-Pottery or early Pottery Neolithic), Azraq 30, Jilāt 23, 24 (Burin Neolithic), and at the ?Roman wall surrounding Biraket Qeissiyeh east of Azraq es-Shishan (see Figs. 1-5).

Azraq 21, C Spring.

The late Lower or early Middle Palaeolithic site at C Spring was discovered by the Baker-Harza Company (1958) during the excavation of canals south of Azraq esh-Shishan in 1956. Owing to political circumstances as well as flooding, no careful excavation was possible at the time, but the site was visited by Diana Kirkbride and later by Frank Zeuner. Both wrote reports, but these were mislaid for many years. A large number of artifacts and bones were collected and the latter were studied by Juliet Clutton-Brock (1970). The species included *Dicerorhinus* sp., *Equus hemionus*, *Equus hydruntinus*, *Camelus dromedarius*, *Alcelaphus* sp., *Boselephas* sp. (?) and *Bovini*, indicating a steppic environment. The flints, like the reports, were mislaid until recently, but are now being studied by Lorraine Copeland and Francis Hours. The discovery of the reports has allowed us to reidentify the location of C Spring and during the 1985 season a 3x3m. trench was excavated about 30m. east of

the original findspot (see Figs. 2,5). It was not possible to reexcavate alongside the original trench, because the area has recently been bulldozed for fish ponds.

Excavations were made to a depth of 3.5 m. and the following levels were found:-

1. The top 0.9-1.5 m. consisted of aeolian silts, similar to those collecting in the area today. There was secondary carbonate induration at the base of this horizon and a Pre-Pottery Neolithic B arrowhead was found in this level.
2. 0.4-1.0 m. of grey-brown clay with an unconformity at the base. Several backed bladelets were found in this sediment indicating an Epipalaeolithic age (20-10,000 b.p.).
3. At c. 2 m. depth there was a major unconformity in the sequence and the surface of the underlying sediment was covered with 5-10 cm. of cream coloured sand.
4. Beneath the unconformity there was a further 0.8-1.0 m. of grey-brown clay containing a number of small but undiagnostic flint flakes.
5. At a depth of 2.85-2.95 m. the clay gave way to a blue-grey silt. In this we found a number of unabraded late Lower/ Middle Palaeolithic bifaces, levallois flakes and debitage. The silt also contained poorly preserved animal bones and bovid teeth.
6. At c. 3.10-3.20 m. depth we found a 10-20 cm. thick layer of unabraded late Lower/early Middle Palaeolithic bifaces, levallois flakes, cores, and debitage in a matrix of blue-grey silt. In lenses beneath were further artifacts in a yellow-grey silt.
7. Underlying the artifact horizon was a culturally sterile rolled flint pebble fluvial channel fill. We stopped excavation at 3.5 m for safety reasons and because the gravel was saturated with water.

The rediscovery of C Spring is important as although Lower and Middle Palaeolithic industries are widespread in the Ba-

sin, it is very rare to find a potentially *in situ* site. The only other possible example is 'Ain el-Assad (Azraq 1 — see Fig. 5) which was also found during canal digging by the Baker-Harza Company (1958). However, recent excavations aimed at re-locating the source of this material have been unsuccessful (Rollefson 1982).

Azraq 17

Azraq 17 was located during the 1975 reconnaissance of the Azraq area (Garrard *et al.* 1977) and was thought from surface collections to be of Early Epipalaeolithic date. Geomorphological evidence from Wadis Jilāt, Kharraneh and 'Uwaynid, as well as from other area of the Near East, suggest that this was a dry episode.

The site itself is located on an island within the present marshes (Biraket Qeissiyeh) east of Azraq esh-Shishan (see Figs. 2,5). Two trenches were begun, but in the case of the first (Sq. 1-6) the occupation appeared to be very superficial or entirely deflated, and in the case of the second (Sq. 9-15) an extremely hard calcrete prevented deep excavation. A superficial examination of the industry from Sq. 7-15 supports the idea of an early Epipalaeolithic date, but the industry from Sq. 1-16 is likely to be mid Epipalaeolithic. Small quantities of bone and charcoal were obtained from Sq. 7-15 so we hope to obtain a C14 date for the earlier industry.

'Uwaynid 14 and 18

These two mid-Epipalaeolithic sites were discovered in 1982 (Garrard *et al.* 1985a) eroding from the base of terrace remnants at the confluence of the Wadis 'Uwaynid and Janāb, immediately southwest of Qaṣr 'Uwaynid (see Figs. 2,4). At the time, it was thought that they underlay lacustrine sediments belonging to a late Glacial expansion of the Azraq lake. However, as a result of excavating two trenches in each of the sites during the 1985 season, it is now clear that the so called lacustrine deposits are in fact fluvial silts and sands which have been heavily indurated with carbonates and gypsums forming caliches.

The archaeological material is contained in aeolian silts of c. 50 cm. depth in which soil profiles have developed. The soils indicate more humid conditions than the present with continuous probably stepic vegetational cover. This is similar to the sedimentary environment in the lower two phases at Jilāt 6. Subsequently, there was renewed aeolian aggradation and then fluvial deposits spread across the site. Later there was heavy carbonate and gypsum induration suggesting arid conditions. Finally, after further fluvial deposition the Wadis 'Uwaynid and Janab incised to their present beds leaving the sites in isolated terrace deposits.

At 'Uwaynid 14 and 18 a number of superimposed archaeological horizons were found. At 'Uwaynid 14, the archaeological material consisted of three very distinct knapping floors separated by sterile deposits. At 'Uwaynid 18 the archaeological horizons were much thicker and large quantities of gazelle and wild ass bones were found in addition to artifacts. Hearths were discovered in both sites and it is hoped that these will yield C14 dates. At 'Uwaynid 18 one of the hearths was surrounded by large numbers of basalt pebbles which may have been used for cooking purposes.

Azraq 18

The late Epipalaeolithic site of Azraq 18 was found during the 1975 survey amongst the silt dunes immediately south of the Azraq marshes (Garrard *et al.* 1977). It is located adjacent to a small but perennial spring and within 0.5 km. of the present Qa' el-Azraq (see Figs. 2,5). Surface artifacts were evident over an area of 2,200 Sq. m. and a single trench of 6 Sq.m. revealed 30 cm. of archaeological deposits. These were contained in aeolian sites/ sands heavily indurated with carbonates.

In addition to flints and marine shell beads, the occupational deposits were rich in wild cattle, gazelle and ass bones and amongst these was a complete cattle horn core placed in an arched position in the

ground. Also, the disarticulated and very crushed remains of between five and seven human skeletons were found. These were not contained in any obvious burial pit and if such had existed it had been disturbed by later occupation.

Azraq 31

The late Pre-Pottery or early Pottery Neolithic site of Azraq 31 (c. 8,000 b.p.) is located on a calcrete shelf amongst silt dunes on the edge of the present Qa' el-Azraq. It is also within 0.5 km. of the Azraq marshes (see Figs. 2,5). The surface spread of artifacts covers c. 4,350 Sq. m. and samples collected in 1982 were described in Garrard *et al.* 1985a.

During the 1985 season, three soundings were made, two in the centre of the site and one on the perimeter of the calcrete shelf. Sq. 1-4 yielded c. 40 cm. of *in situ* archaeological deposits in a matrix of aeolian silt/fine sand overlying the calcrete bedrock. In the basal deposits were a series of superimposed hearths, one of which contained heat cracked pebbles, which may have been used for cooking. Higher in the sequence was a pavement of angular calcrete pebbles.

The second trench Sq. 5-8, 14 contained 50-60 cm. of archaeological deposits overlying a sterile sand. The upper levels lacked distinctive features but at the base of the archaeological sequence was a one course stone wall of rough calcrete blocks and two graves, one dissecting the other. Both contained well preserved articulated human skeletons, but no grave goods. The earlier burial was cut above its pelvis, but appeared to be lying flat on its back. The second was lying on its side with its hands flexed under its skull.

In addition to flint artifacts, a small number of ground and carved stone objects were found including beads and a palette. Many of the stone beads were made from green *Dab'a* marble, whose source lies beyond the Wadi el-Jilāt, 65 km. to the south-west of Azraq. There were also a large number of marine shell beads. Bone

and charcoal was well preserved in spite of the saline conditions. Amongst the bones were a large number of gazelle and a smaller number of wild cattle, ass, hare and bird specimens. In addition, there were a small number of sheep or goat bones. Since these species do not occur in the Epipalaeolithic sites and the local ecology would probably have been unsuitable for wild sheep and goat, it seems likely that they were introduced by man. They therefore represent the earliest evidence for domestic animals in the region. The Pre-Pottery Neolithic B site of Jilāt 7 which was C14 dated to $8,810 \pm 110$ b.p. (OxA 526) and $8,520 \pm 110$ b.p. (OxA 527) contained no ovicaprids although probable cultivated barley has been identified. Two possible sheep phalanges were found in a Burin Neolithic site at Jebel Naja in the Basalt Desert, but this occupation has been C14 dated to c. 7,500 b.p. (Garrard in Betts 1985, Betts p.c.).

Azraq 30

'Desert kites' have been observed by many of the archaeologists working in the Basalt Desert of eastern Jordan and on the basis of ethnographic records and rock drawings it is generally agreed that they were used for catching gazelle and other large herbivores. Alison Betts (1984) has surveyed a large number and found Pre-Pottery Neolithic B and Burin Neolithic artifacts adjacent to several suggesting that some at least date back to between 9 and 10,000 b.p. Because of their large size and the sparsity of soil cover, no one has tried excavating in a desert kite to obtain more archaeological information on their function and date. During the 1985 season, we made two small soundings in one of the hides and the corral of a kite found in 1982. The kite is located on a basalt flow 3.5 km. to the south-east of 'Ain el-Bayda on the north-east side of Qa'el-Azraq ($32^{\circ}29' \times 35^{\circ}27'$). Unfortunately neither sounding provided conclusive dating material, although a sparse burin industry was found on the surface of aeolian silts alongside the corral wall.

Jilāt 23 and 24

During the 1930s Waechter *et al.* (1938) located and partially excavated six Neolithic sites in the Wadi el-Jilāt, which lies on the present steppe/desert boundary, 55 km. to the south-west of Azraq (see Figs.1,2). At each of these a scatter of artifacts and stone structures was apparent at the surface. In 1982 a fresh survey was made of these sites and one (Jilāt 7 - see Fig.3) appeared to have a Pre-Pottery Neolithic B industry, two others (Jilāt 23, 24) burin based industries and the other three (Jilāt 13, 25, 26) a mixture of the two. In 1984, two soundings were excavated amongst the structures of the Pre-Pottery Neolithic site and a rich flint and ground stone assemblage was found as well as bone and charcoal. As was mentioned above, the animal bones were of local probably wild species whilst the charcoal included cultivated barley. C14 dates of c. 8,500 and 8,700 b.p. were obtained on wood charcoal.

During the 1985 season two of the burin sites were sounded in the hope of obtaining dates for this industry and information on the subsistence and culture of the manufacturers. The only date we have for this material is c. 7,500 b.p. from Jebel Naja in the Basalt Desert of eastern Jordan (see above).

Both the burin sites had stone circles emerging from their surface. In the case of Jilāt 24, this was a double walled structure of c. 4m. diameter and at Jilāt 23 it was a much larger enclosure of c. 20 m. diameter with a smaller circle of c. 4 m. diameter inside. In both cases the structures were built from limestone slabs placed on end. Two trenches were excavated at Jilāt 24 and three at Jilāt 23, but apart from giving more information on the architectural features, neither gave any more clue to the function or date of these sites.

Roman Wall around Biraket Qeissyeh.

A number of archaeologists including Kennedy (1982, p. 96-107) have noticed a well built buttressed wall of probable Roman date surrounding the main springs at

Azraq esh-Shishan. This wall encompasses an area of c. 10 dunums /0.1 sq. km. There is also a second much longer wall running out from the first, which can be traced for c. 3 km. along the southern and eastern sides of the marsh and for a short distance along the northern side. If this wall completely enclosed the marsh it would have encompassed an area of c. 6.5 sq. km.

During the 1985 season a slot trench was cut on either side of the long wall, at its south-eastern corner, where it runs close to the present qa' / playa (see Fig. 5). The purpose was to obtain information on its function and on the local environment at the time of its construction. At the excavation site the wall was c. 1.55 m. wide and 0.65 m. high and had a semi-circular buttress of c. 0.55 m. radius on its outside. It was built of basalt ashlar enclosing a rubble and cement fill. The ashlar stood upon a foundation of basalt rubble and gravel, but was only standing one course high. Elsewhere up to four courses of stone were noted. The foundation trench which was 0.40 m. deep and 2.05 m. wide was cut into the qa' / playa sediments.

Kennedy and others have suggested that the wall may have served to separate the fresh water of the marshes from the saline water of the qa', however the sedimentation record on either side of the wall does not support this hypothesis. Qa' sedi-

ments seem to have been collecting uniformly on both sides of the wall up until fairly recently. From this very limited sounding it therefore seems more likely that the wall was built as an estate boundary rather than for any hydrological purpose. Unfortunately no dating material was obtained for its construction.

During the 1984 and 1985 seasons soundings have been made at fifteen sites in the Azraq Basin ranging in date from Lower/Middle Palaeolithic to Roman. The main focus has however been on the period relevant to the beginnings of settled life and farming in more fertile areas — the Epipalaeolithic and Neolithic. It is hoped from these excavations, as well as from the reconnaissance work of 1975 and 1982, that we will be able to build up a detailed picture of the major developments in human technology, settlement patterns and subsistence on the north Jordanian plateau, and of its relationship to the main changes in environment, climate, landforms, fauna and flora. Over the next two years a number of specialists (see introduction) will be involved in analysing the finds and preparing them for more detailed publication.

A. Garrard, C. Hunt,
A. Betts, B. Byrd

The British Institute
at Amman for Archaeology and History

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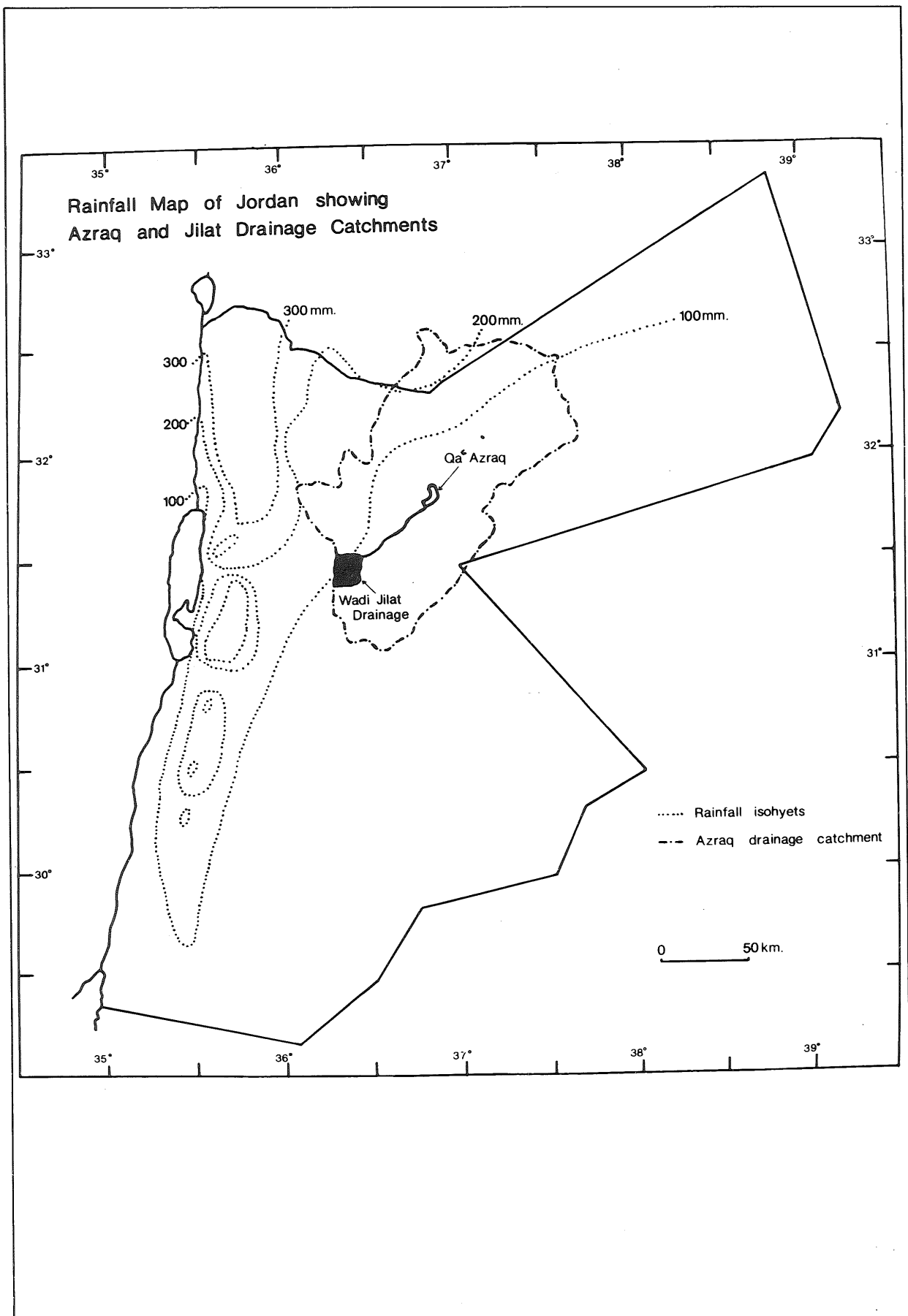


Fig. 1

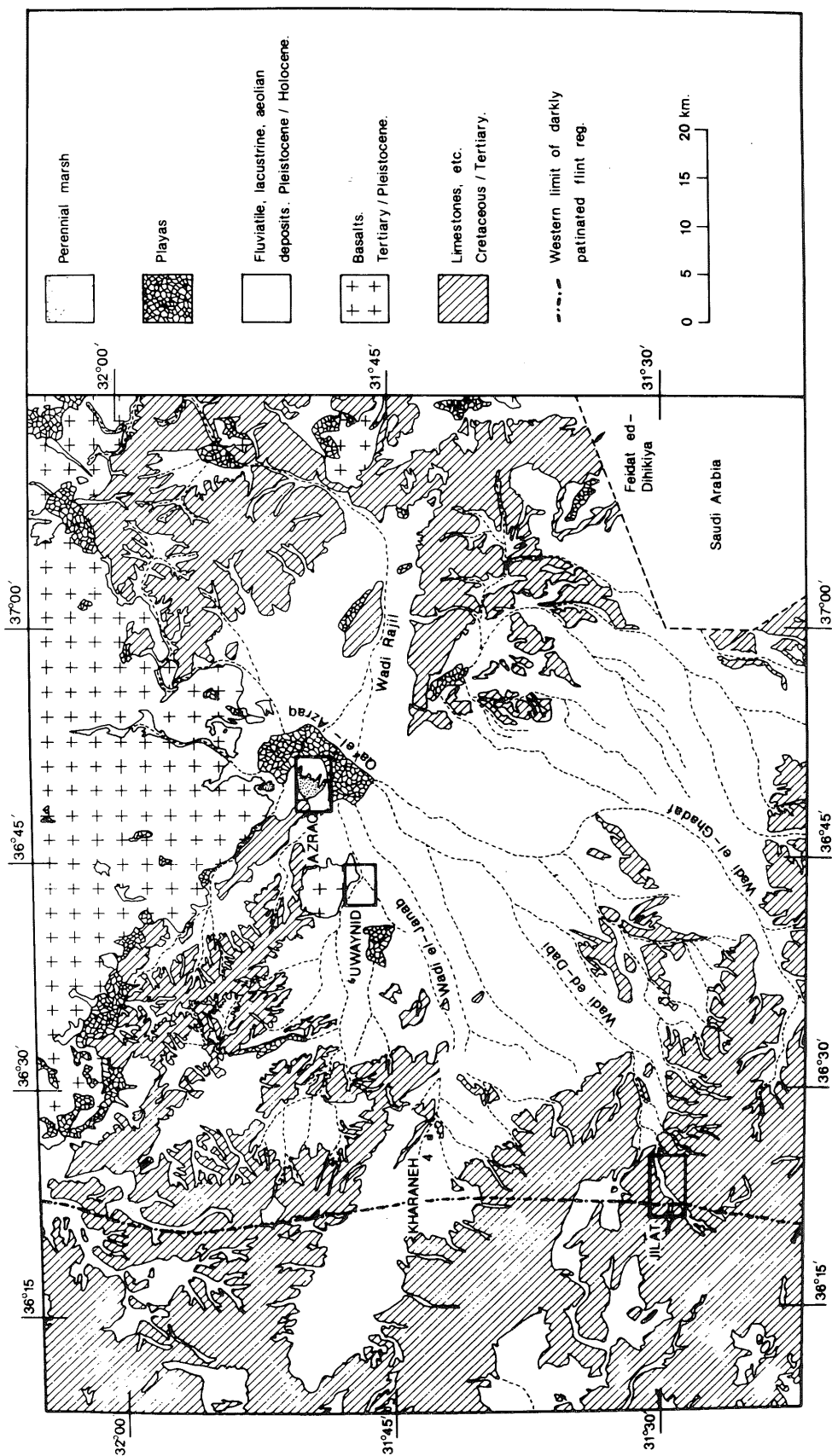


Fig. 2

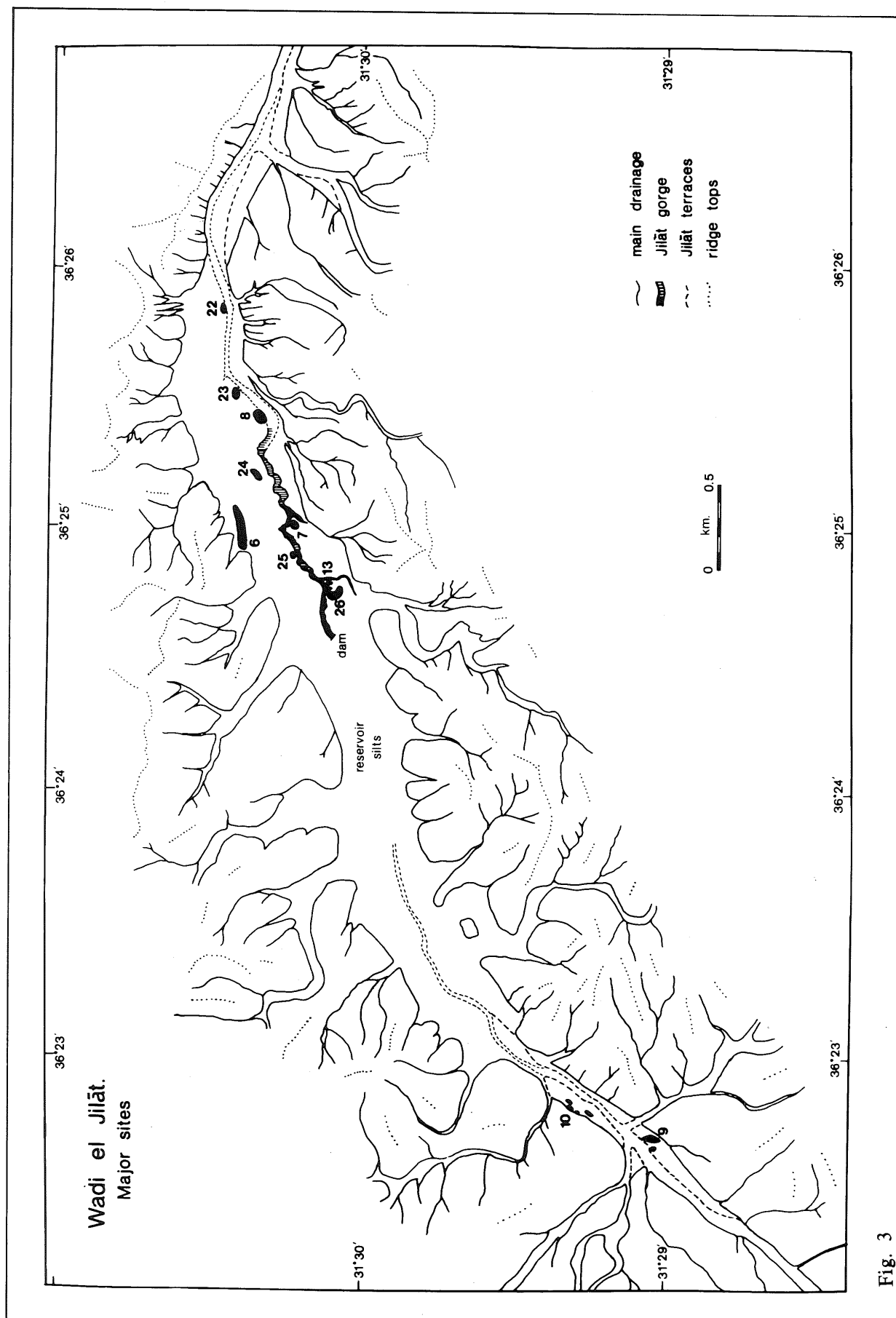


Fig. 3

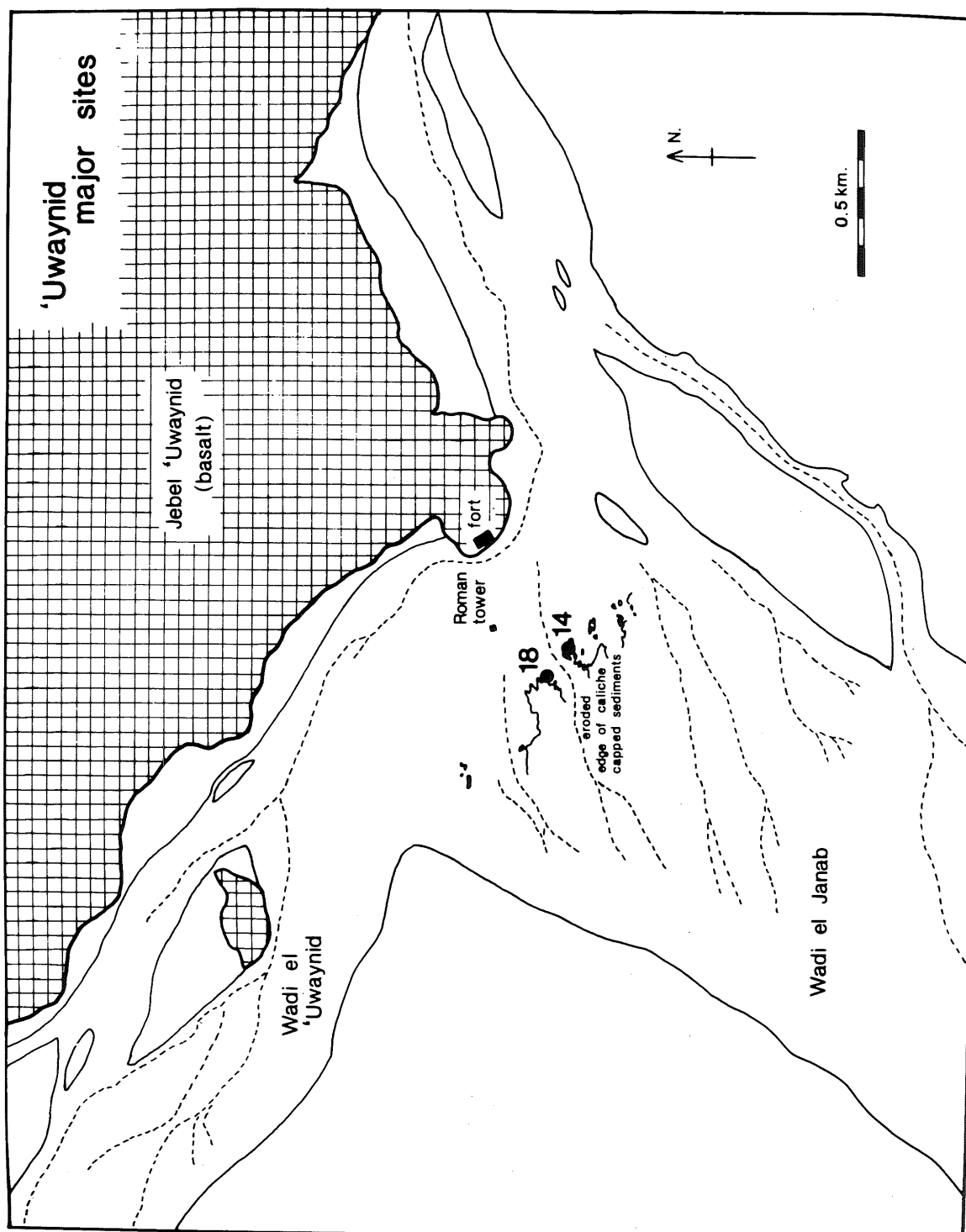


Fig. 4

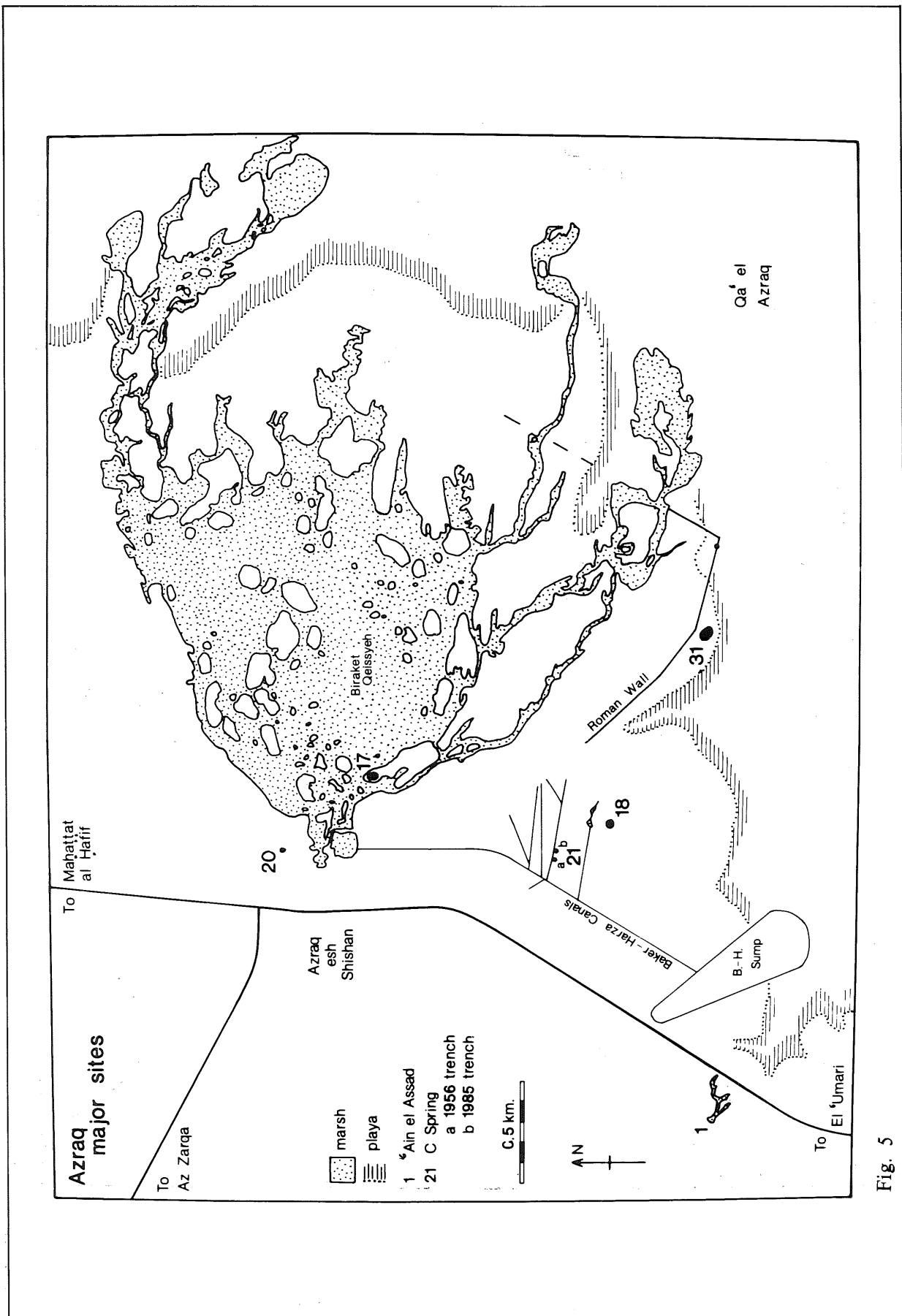


Fig. 5