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## The 'Ain Ghazal Survey: Patterns of Settlement in the Greater Wadi az-Zarqa Area, Central Jordan

### Introduction and Project Objectives

'Ain Ghazal is a major Neolithic settlement located along Wadi az-Zarqa in the northern suburbs of Amman. During the summer of 1987, as part of the greater 'Ain Ghazal Archaeological Project, a survey was conducted in the site's vicinity. Two primary objectives structured this survey: 1) To document if 'Ain Ghazal was surrounded by smaller Neolithic satellite sites; and 2) to document the range of human occupation in the project area. Adding to the urgency of the project is the intense development that Amman is currently undergoing, making it critical to document archaeological occurrences before they are destroyed. The survey was a joint project between the Desert Research Institute of the University of Nevada System and Yarmouk University, with the authors serving as co-directors. The survey has been previously reported on in some detail (Simmons and Kafafi 1988); the present paper summarizes the results.

Excavations at 'Ain Ghazal have revealed it to be one of the richest and most significant Neolithic centers known in the Near East (Simmons *et al.* 1988; Rollefson and Simmons 1987). It was a sophisticated settlement occupied from the aceramic Neolithic (Pre-Pottery Neolithic B, or PPNB) through the early ceramic Neolithic (Yarmoukian) periods. The range of materials recovered from the site is truly impressive, and its importance cannot be overestimated.

Of particular interest has been the documentation of a transitional phase between the PPNB and Yarmoukian periods: This has been termed the "PPNC", and is presently known from only one other site, Wadi Shu'eib (Simmons *et al.* 1989) in the region. Coupled with this and equally significant has been the suggestion, based on preliminary analyses, of a dramatic economic shift from the PPNB through the Yarmoukian. During the PPNB, a broad spectrum economy based on the domestication of a wide range of both plants and animals, supplemented by a large variety of wild resources, was in operation. By the Yarmoukian, however, this economic range had narrowed substantially, with a near exclusive emphasis on domestic

goat/sheep. This has been interpreted as reflecting a change to pastoralism brought about by culturally induced environmental degradation (Köhler-Rollefson 1986; Rollefson and Köhler-Rollefson 1989).

Despite the wealth of data from 'Ain Ghazal, knowledge of its surrounding area was a vacuum, thereby providing the stimulus for the survey. A primary objective of the survey was to determine if 'Ain Ghazal was supported by small satellite sites, or if it operated as an independent entity. Also of interest was the difficult task of determining the presence of late Neolithic pastoral sites. Such a presence would aid in confirming the postulated change to a pastoral economy. In any event, the documentation of any Neolithic sites in the area would help to define an 'Ain Ghazal community, providing us with a better understanding of regional settlement patterns during the Neolithic.

Another survey objective was to document the entire range of human occupation in the study area. This would aid in determining how land-use patterns have changed through time in the northern sector of the greater Amman vicinity.

An allied objective was to inventory archaeological sites in the study area so that proper management could be attempted. Our survey was intended to supply information that might assist in the management and protection of significant sites. Minimally, the survey would provide systematically collected archaeological data for an area under rapid development.

A final objective was to continue geomorphologic research commenced at 'Ain Ghazal. The project geomorphologist, R. Mandel, was particularly interested in formation processes at both 'Ain Ghazal and at surrounding sites. Such information is useful in determining ancient settlement/landform preferences and in predicting site locations, as well as indicating areas where geomorphic processes may have obscured the cultural record.

### Geographic focus and methodology

Six separate survey zones were investigated. Four of these were contiguous and were located along Wadi az-Zarqa.

The other two were located to the north and east of the main survey areas. In all zones, wadi floodplains and adjacent terraces and slopes were investigated. A total of approximately 8.4 square kilometers was systematically surveyed.

Given that the Amman region has been occupied for at least the past 100,000 years, and probably a great deal longer, cultural remains are nearly ubiquitous in virtually any area examined. This led to difficulty in defining a "site." We did not record isolated chipped stone or ceramics as sites, restricting this term to localities exhibiting some clear patterning and/or containing a density of artifacts greater than that of the surrounding area. This procedure allowed for the relatively unambiguous definition of sites and provided a cohesive framework from which to record cultural remains. Not all sites were considered as *in situ* cultural occurrences.

### Results

Within the total area surveyed, 81 archaeological sites were recorded (FIG. 1). This included, as site number 1, 'Ain Ghazal itself. Of the 81 sites, at least 108 components are represented. The distribution of components is as follows: Lower Palaeolithic-5 (4.6%); Middle Palaeolithic-12 (11.1%); Upper Palaeolithic-6 (5.5%); Epipalaeolithic-6 (5.5%); Neolithic-12 (11.1%); unknown, probable prehistoric-16 (14.8%); Chalcolithic/Early Bronze-4 (3.7%); Early Bronze-4 (3.7%); Iron-11 (10.2%); Roman-6 (5.5%); Byzantine-3 (2.8%); Umayyad-2 (1.9%); and unknown, probable historic-21 (19.5%). Note that the chronological placement of components is somewhat different from that initially reported (Simmons and Kafabi 1988:31) in that we now believe there are five late Lower Palaeolithic occurrences and 12 Middle Palaeolithic components. Initially, we felt that all of these were Middle Palaeolithic; we are indebted to G. Rollefson for his assistance with this re-classification. Of the 81 sites, several distinct site types were also recognized as follows: Artifact scatter-34 (42.0%); rock shelter-4 (4.9%); *rujm* ("rubble pile") with ceramics-1 (1.2%); *rujm*, without ceramics-14 (17.3%); tower, without ceramics-1 (1.2%); tower, with ceramics-2 (2.5%); stone ring-2 (2.5%); single structure-5 (6.2%); multiple structure-9 (11.1%); kite with associated structures-2 (2.5%); settlement-6 (7.4%); and terrace-1 (1.2%). The following is a brief discussion the survey results by time period.

*Lower Palaeolithic.* Late or Final Lower Palaeolithic components are quite similar to the Middle Palaeolithic components observed, but all contain small, well-made hand axes. Levallois technique was also present, and most pieces are heavily patinated. These sites may contain Middle Paleolithic components as well. None of these appeared to be *in situ* deposits.

*Middle Palaeolithic.* Of all the identifiable prehistoric components recorded, those with a probable Middle

Palaeolithic date are, along with Neolithic occurrences, the most common. Middle Palaeolithic occurrences were identified by their distinctive technology: Many pieces exhibited Levallois elements, and much of the debitage consisted of pieces with multi-faceted platforms. Numerous Levallois flake and point cores were observed, but tools were not well represented. Of the tools observed, many are side scrapers. Nearly all Middle Palaeolithic pieces are highly patinated. Many of the Middle Palaeolithic occurrences are associated with later materials. All of the sites appear to be deflated surface occurrences with little or no evidence for stratified or intact deposition. Most are located on slopes and benches; a few were on the floodplains of wadis, but these may be redeposited.

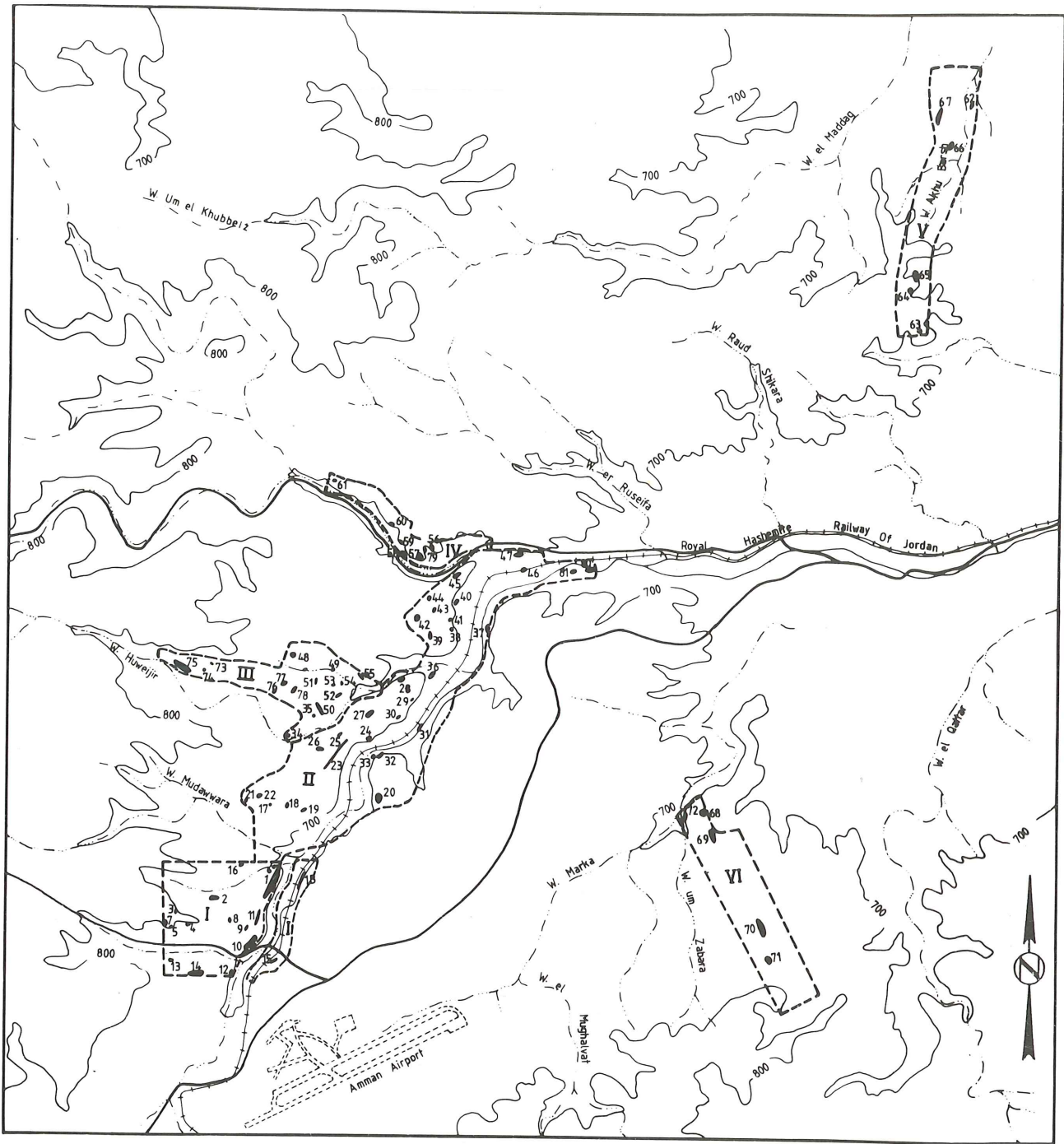
*Upper Palaeolithic.* Upper Palaeolithic occurrences were primarily identified on the basis of debitage, which consists of long, well-made blades. Tools included side and end scrapers, burins, and various retouched pieces. Five of the six components recorded are surface scatters. One is located in a vandalized cave.

*Epipalaeolithic.* As with the Upper Palaeolithic materials, Epipalaeolithic components were identified primarily by their debitage, which consists of numerous bladelets and bladelet cores. Tools were relatively rare, and microlithic tools were even less common. Several backed bladelets, however, were observed at one site. On the basis of surface inspection, none of the sites displayed characteristics common to well-documented Epipalaeolithic periods, such as the Kebaran or Natufian.

*Neolithic.* The documentation of Neolithic sites was one of the major goals of the project. Counting 'Ain Ghazal, 12 Neolithic components were identified. These fall into two distinct groups. The first consists of three sites in the immediate vicinity of 'Ain Ghazal, while the second group is composed of sites located a moderate distance from 'Ain Ghazal.

In the first group, one site probably represents an extension of the southern end of 'Ain Ghazal. It is located south of a series of garages and automotive shops that separate it from the southern boundary of 'Ain Ghazal and is situated on a relatively steep slope. Numerous plastered floors and wall sections can be clearly discerned in exposures. Associated artifacts are also similar to those observed at 'Ain Ghazal and there appears little doubt that it is an extension. This increases 'Ain Ghazal's size by some 300 meters in a north-south direction. The size of the east-west expansion is more difficult to determine due to modern disturbance. It minimally covers 30 meters, but conceivably could stretch across Wadi az-Zarqa, as in the northern sections of 'Ain Ghazal. If this were the case, the east-west extension could cover an estimated 300 meters. In any event, the discovery of this site makes an already enormous site even larger. The exposed materials appear to be related to the PPNB occupation of 'Ain Ghazal.

Another Neolithic site lies immediately to the south and,



'Ain Ghazal Archaeological Survey 1987

0 500 1000 2000 Meters

1. 'Ain Ghazal Archaeological Survey, showing the locations of transects and sites.

again, could represent an extension of 'Ain Ghazal itself. The Neolithic occupation documented here, however, appears to be restricted to the Yarmoukian phase. The main component of the site is a large Early Bronze Age settlement previously reported by Petocz (1987). The site has been badly damaged by modern development, and intact deposits are very limited.

The last site in this first group of Neolithic occurrences is also located on a relatively steep slope. It is south of the site just described and is defined by a section of plastered floor similar to that seen at PPNB 'Ain Ghazal. The site is located on an exposure immediately beneath the Marka power plant and has been severely damaged. Beyond the floor exposure, no other cultural remains were observed.

The second group of Neolithic sites are located along Wadi az-Zarqa and related smaller drainages. Two probable Neolithic sites were also recorded in the two outlying transects. All of these sites are defined by a large number of burins. As such they resemble the burin sites known in the Black Desert (Betts 1986; Betts and Helms 1986; Garrard *et al.* 1987; Rollefson and Frohlich 1982). Although most burin sites seem to be restricted to the desert areas of Jordan, at least one has been recorded in the Amman area at Umm Udheina (Rollefson *et al.* 1982).

The function and precise chronology of these sites is unknown. Most researchers feel that they date to either the late Pre-Pottery Neolithic or the Pottery Neolithic. Unlike some of the burin sites in the desert, those recorded by the 'Ain Ghazal survey do not appear to contain diagnostic PPNB or later Neolithic projectile points. Systematic surface collection, however, might negate this statement. The associated debitage at the sites consists of both flakes and blades. Other tools were relatively rare and usually consist of retouched pieces, although several perforators and, in a few instances, some adzes, were observed.

Most of the burin sites recorded are surface scatters without associated structures. Two sites, however, did contain *rujum* that might be associated with the Neolithic occupations. One of these consists of a single feature, while another is composed of a series of *rujum*, one of which was open at one end.

Also of interest here is the presence of two probable linear "kite" sites. These have been documented in the Black Desert, where they are often associated with Neolithic artifacts. Of the two recorded here, however, one is associated with Chalcolithic/Early Bronze Age materials while another is undiagnostic. It could conceivably be Neolithic, but would require excavation to verify this.

**Chalcolithic/Early Bronze.** Chalcolithic/Early Bronze Age components represent a variety of site types. One is a relatively large settlement consisting of several room blocks. Another is a "kite" site that also contains a stone circle on a ridge top. Yet another overlooks a small wadi and consists of substantial architectural remains. The site also contains an Iron Age component. Finally, the

Chalcolithic/Early Bronze component of one site consists of a single rectangular structure. This site also contains a Neolithic occupation.

**Early Bronze Age.** Three of the four Early Bronze Age components were surface scatters with limited amounts of pottery. One, however, consists of a relatively large settlement that has been badly disturbed by modern development. It also contains a Yarmoukian Neolithic component. This site is the one previously recorded by Petocz (1987).

**Iron Age.** Iron Age components included a wide variety of site types, consisting of two tower sites, two ceramic scatters, four multiple structure sites, one settlement, one *rujm*, and one stone ring site. Ceramics from both Iron Age I and Iron Age II periods were recorded. At those sites containing structures, rectangular forms were the dominant morphology.

**Roman.** Roman sites were generally represented by only limited amounts of Roman ceramics mixed with artifacts from other periods. Only one substantial Roman site was recorded. This is a very badly disturbed, but large, settlement located at Ras al-'Ain.

**Byzantine.** Byzantine components are also very poorly represented. All three recorded are artifact scatters containing Byzantine sherds along with artifacts from other periods. Two of these are located in plowed fields, while the third is on a ridge top.

**Umayyad.** One of the two Umayyad sites recorded consists of an undetermined number of rooms. It is located immediately upslope from and adjacent to 'Ain Ghazal. The other Umayyad occurrence is a scatter containing artifacts from several periods.

**Unknown Chronology.** A large number of components contained no diagnostic elements and therefore are chronological "floaters". There were two general categories of these "unknown" sites: Lithic scatters and structure sites. The structure sites are tentatively identified as "unknown historic" sites, while the lithic scatters are presumably prehistoric. The structure sites most often consisted of *rujum*. One of the two "kite" sites also falls in the "unknown" category.

### Conclusions

The 'Ain Ghazal survey documented a relatively high site density of 9.6 sites (12.8 components) per square kilometer. These sites covered a wide span of human occupation, with the earliest dating to the late Lower Palaeolithic and the latest to the Umayyad period.

The survey data clearly point to a consistent and relatively dense occupation of the Amman area for the past several thousand years. The nature of this, however, varied considerably. The earliest, represented by Lower, Middle and Upper Palaeolithic lithic scatters, conforms to patterns observed at similar sites throughout the Near East, with the

exception that no long-term cave occupation has been documented. The presence of Epipalaeolithic sites is of interest, especially since those recorded are not typologically consistent with Epipalaeolithic sites known elsewhere.

Of particular interest to the project has been the documentation of Neolithic sites surrounding 'Ain Ghazal. The size of 'Ain Ghazal has been expanded as a result of the survey, and the presence of numerous burin sites has added to the complexity of Neolithic settlement in the area. It is tempting to consider the "kite" sites as Neolithic manifestations, but this cannot be supported by the data at hand.

We had expected, even anticipated, finding smaller Neolithic villages, farmsteads, or pastoral sites. This was not the case, unless some of the chronologically ambiguous lithic scatters and *rujum* or structure sites are Neolithic. This appears unlikely, since no Neolithic artifacts were associated with these sites. Indeed, one question posed by the survey is the presence of the numerous *rujum* sites throughout the Amman area. Many of these may well represent communication towers of some sort and may be contemporary. The nature of these sites, however, can only be answered by excavation.

It now appears that 'Ain Ghazal did, in fact, operate as a relatively independent settlement and that major support sites were not a part of its settlement system. It is, however, possible that some Neolithic settlements may be buried under relatively recent deposition. The tendency for such sites to be located on low slopes near major wadi systems may have rendered them nearly invisible to conventional archaeological survey. If road construction had not exposed portions of 'Ain Ghazal, the site would not have appeared very substantial on the basis of surface remains alone. In the areas that we surveyed, this must remain a possibility. On the other hand, we thoroughly investigated the numerous exposures present around Wadi 'az-Zarqa and some of its tributaries and found no evidence for any buried Neolithic materials. To complicate matters even further, it must be remembered that the area immediately adjacent to 'Ain Ghazal has been severely impacted by modern development, which could have totally destroyed any traces of Neolithic (or other) sites.

On the basis of the survey data, however, we tentatively conclude that there are no major Neolithic sites located in the areas that were investigated. The presence of smaller, specialized activity sites attests to a Neolithic presence in the 'Ain Ghazal hinterlands, but this appears to have been of a limited nature.

During the "historic" periods, several interesting patterns emerge upon examination of the survey data. Overall, the earlier (i.e., prehistoric) periods are better represented than many of the later periods. This may be due to the tremendously longer time span of the prehistoric periods, thus allowing for the accumulation of more sites. On the other hand, later sites have a better chance of being

preserved in the archaeological record, thus their relative scarcity during some of the historic periods may well be real.

A relatively substantial Chalcolithic/Early Bronze Age occupation has been documented. In light of this, the lack of Middle Bronze and Late Bronze Age sites is surprising. Iron Age sites are well represented, but again the total lack of remains dating the "Classic" Hellenistic period of Amman's antiquity is curious. For whatever reasons, Hellenistic occupation appears not to have expanded north from the Amman Citadel area.

One possibility that should be considered in interpreting the lack of major later sites is that after approximately two thousand years of successful exploitation during the Neolithic, the immediate environment of the area was depleted and unsuitable for agricultural economies. Unlike many major Neolithic sites, there is no substantial later occupation of 'Ain Ghazal. It is possible that the success of the Neolithic could have rendered the 'Ain Ghazal vicinity marginal for any major agricultural activity. This could account for the relatively specialized and ephemeral nature of many of the later sites. The dates of the numerous presumed "historic" *rujum* sites would be of considerable interest here.

In conclusion, the 'Ain Ghazal Archaeological Survey has documented a rich and diverse human occupation of the area north of Amman. The study has demonstrated the utility of a systematically conducted survey, recording *all* cultural occurrences, and not those relating only to specific periods. This information can provide a substantial data base that should be of interest to both researchers and planners.

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