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## NEW DISCOVERIES AND DOCUMENTATION OF MEGALITHIC STRUCTURES IN JUFFAIN DOLMEN ARCHAEOLOGICAL FIELD, JORDAN

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### ABSTRACT

The research presented here is about documentation, analysis and sharing new discoveries of Juffain megalithic field. Using Geographic information system (GIS) to produce topographical maps is the basis for the conservation and the development of a Dolmen Heritage Park. A previous survey with Perugia University, was performed in 2016, which provide insight about the high density of megalithic structures and study of structure distribution. While collecting data for a topographical map, of the structural types there are two different categories, single and centers. Single structures are those that stand alone they are, D, Dolmens; TU, Tumulus; T, Tomb; PA - Patio, W - Wall, CA - Cave, CIS - Cistern, S - Silo, P - Press, QS - Quarry Stone, C - Circle and SS - Standing Stone. Five major stunning discoveries relating to the dolmen culture is found. In rank of Importance, here are the discoveries: (1) borders and boundaries, show that each of the dolmen groups stand alone, (2) domestic meeting places point to a sedentary society, (3) quarries and cup hole centers demonstrate a high scale of distribution of central places, and (4) ritualistic centers indicates a higher level of human relationship. (5) New 54 new dolmens were identified. Furthermore, ceramic typology identified 7 major pottery types with an additional 3 minor types. Understanding dolmen types and the megalithic structures related to them was attained using a holistic approach. Our study of the six types (1, 2, 3, /...6) is revisited with the result of the Six basic principles lead to the certain association of social groups, most likely clans at Juffain.

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**KEYWORDS:** Documentation, dolmen, conservation, GIS, Typology, Heritage, Roman, Jordan

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## 1. INTRODUCTION

The Juffain Dolmen Field is located on the south-west border of the modern town Juffain, overlooking the Jordan Valley and the Sheikh Hussein Bridge to the West. The east corner of the field corresponds to the coordinates N 32°28'55.0", E 035°38'59.5" (Fig. 1 and 2) and on (Mega-Jordan.Org, Juffen). A forest of oak and pine trees, on government land covers most of the central dolmen field and makes it highly unique.

The site measures 1 km east to west and 1.3 km north to south, and is broken by six major and five minor valleys. Preliminary analysis of dolmen groups shows clear separation for autonomous groups (TBP with the Final Report not published). Two other dolmen fields in Jordan exhibited clear separation of occupied areas and were selected for this study because of their similar topographical and/or walled borders, Mutawwaq and Matabi (Polcaro, Muniz, Alvarez and Mogliazza, 2014: 1-4, Clayton, 2006: 6-10). A holistic (looking at all megalithic structures), approach of studying all megalithic

relationships and distribution is the only way to understand the group dynamics of the people living in the Juffain Dolmen Field (Schath, 2017: 151).

In October 2017, the Dolmen Heritage Park Project, Yarmouk University, collected data to develop topographical maps and document megalithic features in the Juffain Megalithic Field. This data was collected in support of the hypothesis laid out in the project proposal, (see Background). From the points of view of documentation and archaeological analysis, we will produce topographical maps, contour map and technical drawings to illustrate elevations, sections and plans, and to generate a measurable 3D PDF with the geometry of the monument. These products have been used for conservation. This survey ultimately resulted in five new discoveries in the Juffain Dolmen Field, (1) five stone quarry operations. (2) cup hole centers (3) domestic meeting places, (4) ritualistic centers and (5) Borders and boundaries establishing that there are separate autonomous groups. As well as 54 new dolmens type were identified.



Figure1. Location map of Juffain field..

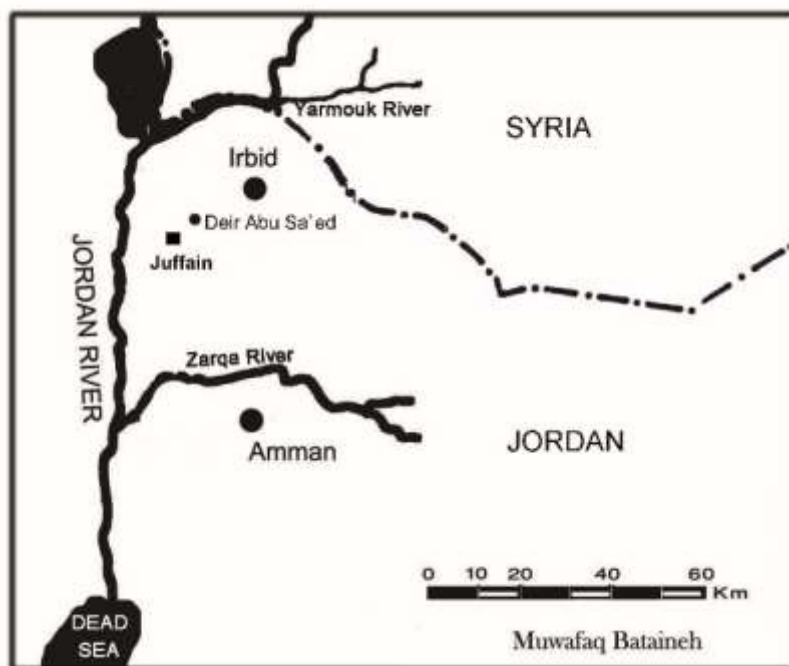


Figure 2. Location map of the studied area.

## 2. BACKGROUND AND PREVIOUS WORK AT JUFFAIN

In his Dolmen Field Guide, Scheltema mentioned that Fiona Baker logged 154 dolmens and other structures at Juffain and described the Juffain Dolmen Field, (2008: 67-68). A survey of the Juffain Dolmen Field was conducted in May, 2016 with Perugia University and the Final Report was submitted to DoA. It provided theory and insight for the new discoveries encountered during this survey (Schath, Polcaro and Casadei, 2016) (Figure 3). Three enigmatic questions annoy dolmen scholars not because they can't be answered, but rather answered convincingly with valid argument and proven. Those questions are, (1) when the dolmens were built, (2) who built them and (3) how were they used? The new discoveries at Juffain may possibly hold the answers.

A plethora of information about dating of dolmens is available to wade through. The Ghassulian Culture, of Telielat Ghassul and the Adiemeh Dolmen Field provides dating for dolmens, of 4000 BCE, or the Late Chalcolithic period, (Stekelis, 1977: 827-830). Radiocarbon, or Carbon 14 dating was provided by, Athfield, Beavan N. and R J

Sparks, which corresponds to and validates that dating, (2004: 315-323).

The dolmen field at Jebel Mutawwaq, has a village which points to an Early Bronze I, dating to 3600 BCE, (Polcaro et al 2014: 1-17). But at other various sites, a long period of construction, use and re-use was uncovered such as, Matabi with dates of nearly 2,000 years of occupation (Schath, 2017:551-556). A concise history and summation of dolmen dating, showing use and reuse of dolmens from 4,000 and 1,900 BCE, is provided by Kafafi and Scheltema and is commonly agreed upon, (2005: 13-15). The question of dating is really a moot point.

The question of who built the dolmens, whether nomadic or sedentary people has eluded scholars for 150 years, and arguments come from both camps. There is a vast corpus of research for the combined dolmen fields just North of the Dead Sea. This combined field contains the Adiemeh, El-Quttien, Heshbon, Aw-Rawdah and Matabi dolmen fields. Here are just a few researchers of note and a couple not so known, that would argue for settled people being associated to dolmen fields, (Condor 1889, Stekelis 1935, Glueck 1951, Swauger 1966, Dajani 1967; Yassine, Ibrahim and Sauer 1988, Prag 1989, Belmonte 1997, Al-jarrah, Clayton 2006, Collins 2005 to present and Schath et al. 2012).

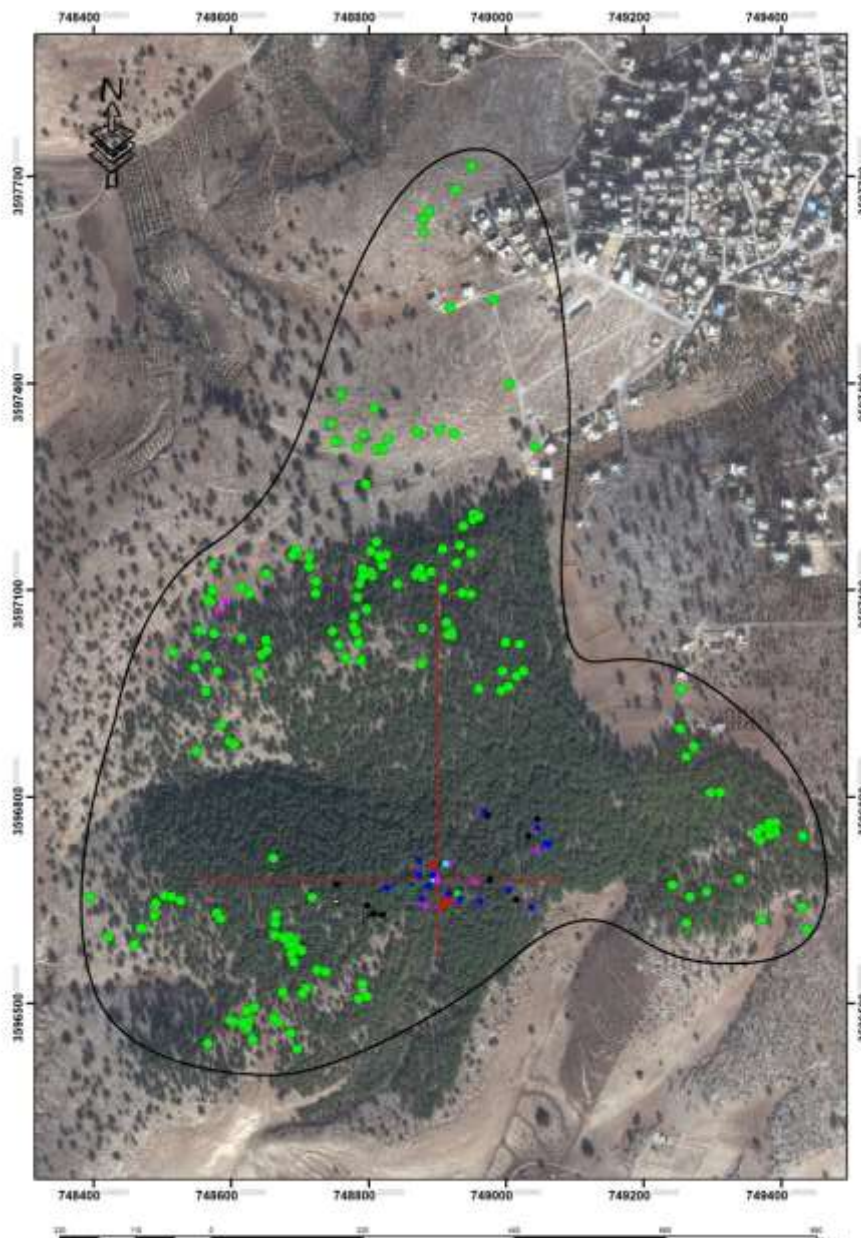


Figure 3. Juffain Dolmen Field Map with survey points.

The hypothesis forwarded by Schath indicates that separate groups of dolmens suggest a separate group of people and therefore, at least some of those people being sedentary. The studies at Juffain can answer this question in a convincing manner.

Dolmens use is another enigmatic question, wrought with unproven data and reliability. Speculation has entered the fray through misrepresentation of terminology, what has been tested and referencing others on pure faith.

Bone fragments are definitely found within dolmens, and arguably any scholar of dolmens will agree on this point. A look at photos from (Dajani, 1667-68), (Polcaro *et al.* 2014) and (Schath, 2017) will show bones discovered in dolmens. The argument

here, is that two of those dolmens were Type B as most likely the third. Types of dolmens make a difference and Type B dolmens show interment with larger bones and Type A dolmens tend to have only small fragments of bone.

With a miniscule percentage of dolmens discovered with bones and in those cases, only a few complete bones, it is hard to make a case for dolmens being graves.

One scholar that discusses the questions of bones in dolmens is Khair Yassine, he acknowledges the presence of bone material in dolmens, but does not go so far as the guarantee burials, (2012, interview). In 2010 and 2011 bones were discovered in two dolmens, (Schath 2012 and 2017). Just saying



scholars agree they are graves does not make them so. On the other hand, it is safe to say, scholars can agree that dolmens serve in some form of funerary even ritualistic practice.

Studying hundreds of articles about dolmens and mentally weighing them has produced a certain skepticism. That skepticism lead to research outside the main stream and lead to the theory that dolmen fields represent one of the earliest forms of autonomous clan based settlements, (Schath 2017).

Three articles provide a basis for his hypothesis: (1) (Clayton, 2007), reports of her survey of the Matabi dolmen field, (2) (Schath, Collins, Al-jarrah, 2012) excavated dolmens in the Aw-Rawdah and Matabi dolmen fields, and (3) (Polcaro et al., 2014), reported on the excavation of a special dolmen at Jebel Mutawwaq and shows settlement occupation at a dolmen field.

To test the theory of dolmen fields being clan based settlements, a hypothesis was forwarded. If a complete megalithic field could be found, analysis of separation and dispersion of dolmen groups should show organized autonomous settlement within the larger megalithic field. Several criteria guided the project and how it was to be carried out: (1) having studied the Matabi and the Jebel Mutawwaq dolmen fields, and their associated settlements along with their geographical relationship in Jordan a comparable field needed to be found. two areas were candidates, Wadi El-Yabis, which was rejected, (Palumbo, Mabry and Kuijt, 1990: 111-113), and the Irbid region, selected for its multiple fields, (Scheltema, 2008); (2) the field had to have at least two dolmen groups, separated from each other topographically and/or with walls and (3) there needed to be enough other, un-disturbed and intact structures to study relationships through dispersion analysis.

Dispersion studies were carried out by Swauger (1965: 7-17). In his study he measured the distance between dolmens in a group to determine a pattern. His mistake was not factoring in the topography such as ridges and the next dolmen group or relationship to other megalithic features.), so no pattern was found; (4) it was expected that topography would be of significance so maps would need to be prepared for analysis of the group separation.

Subsequently the Juffain Megalithic Field was discovered during the 2016 survey, which lead to the 2017 survey project, (Schath, Polcaro, Cassadei 2016, Final Report to the DoA, on file.) and (Schath, Shiyab, Al-jarrah, Primary Report to the DoA, on file).

Understanding dolmen types and the megalithic structures related to them can't be attained by

reading about the six basic dolmen types. One must study the six types and examines each in the field. Only then, can appreciation of the complexity of the six general types becomes apparent.

Research about individual uses by type is non-existent. Each design could easily have been used for a specific purpose, much like different types of shoes are worn for different purposes, not just walking.

Caution needs to be practiced when describing dolmen types. Though the standard six versions of dolmens are generally accurate, (Epstein, 1985: 23-25, Zohar 1992: 44-45) each type of dolmen has many types of variations (Schath 2017). At Juffain these expansive design aspects are being recognized and studied to better understand the dolmens.

For 2017 survey projects of the Juffain Megalithic Field, a glossary was prepared and definitions of the six types of dolmens as well as "Architectural Components" was prepared. The importance of describing dolmens in minute detail, then drawing and photographing them can't be understated. Dolmens at Juffain fall into four general types, A, B, C, and D. Each of these general types, there are indications of other types, but there are many different variations. Detailed studies of these differences need to be completed, before a full picture of each dolmen type and their relationship in a complete megalithic group is determined.

Cataloguing all megalithic structures and preparing a topographical map showing the location of each feature was critical for the successful completing of the survey. Understanding the relationships of megalithic groups and types of features commonly found in a group is the key to the culture and ritualistic nature of this field.

### 3. METHODOLOGY

The Juffain Dolmen Field is essentially a 1,000-meter circle cut by six major valleys that emanate outward from one general point.

In the previous survey, around 150 structures were identified and documented, while in this study the Team documented 384 structures using a Garmin, Global Positioning System (GPS) to locate coordinates, North, East and Elevation, as a bare line. The Total Station™ was used as the main device to measure the exact height of each unit datum relative to the base points. Then each structure was identified and documented, on a worksheet providing a sequence number, letter designation, photo numbers and the coordinates. The worksheets will be used in later work and additional data sheets added. All information was added to a data base for future research and publication.

Later, a Wild Total Station T1000, was used to survey the site and develop the topographical map

with a scale of 1: 10,000, using the Universal Transverse Mercator Projection (UTM). All features are identified and represented in a key to the map, (TBP with the Final Report to the DoA).

Using geographic information science (GIS) for archaeological analyses, such as predictive site location modeling and producing topographical site surveys. Also GIS will be used to create vector layers of the main architecture component of the field. Photogrammetry will be employed to generate a digital elevation model and an Orthophoto which can be used together to give an actual terrain view for the historical structure

The GIS are useful not only to archaeological research but also for the preservation of cultural heritage. It could be used to protect the archaeological heritage, through the maintenance. The GIS is useful to assure a periodical monitoring of monuments. A lot of disciplines are involved in conservative process. It is necessary to make an effective management GIS system to coordinate different disciplines a periodical system to maintain artistic, historical and material characters of the structures; it guarantees the conservation, it is more effective and it assures the protection of cultural heritage instead of pressing actions. Typological systems are essential for communication between anthropologists as well as for interpretive purposes. Typological classification, where the numerous artifacts are clustered into discrete 'types', and the assemblage is sorted according to these pre-defined types. Underlying this approach is the assumption that artifacts were produced according to, and therefore can be classified into, discrete templates. Traditional shape descriptions and classifications, however, rely on intuitive, often vague characterizations, which are hard to quantify. Terms such as 'everted/ inverted rim', 'squat body', 'high carination', or even 'elegant curves', which do not have a unique interpretation will be used.

## STRUCTURES

The group dynamics of the Juffain Dolmen Field are complex and diverse, which makes megalithic relationships ultimately responsible for the clarification cultural interaction. 384 structures were documented and sixteen structural types designated and shown on, (table 1). A single grinding wheel was found and not shown.

Of the structural types there are two different categories, single and centers. Single structures are those that stand alone they are, D, Dolmens; TU, Tumulus; T, Tomb; PA - Patio, W - Wall, CA - Cave, CIS - Cistern, S - Silo, P - Press, QS - Quarry Stone, C - Circle and SS - Standing Stone. These structures are all commonly found in combination with other structures, (Studies of common relationships is non-

existent, as is the case for center structures). The designation of center structures is a departure from viewing some features as individual, but rather as a collective unit.

The CH - Cup Hole Center is the first of these designations. Though cup holes are recognized by most researchers, very little has been published. At Juffain 10 centers with large concentrated groups of cup holes were recognized. Though cup holes are found individually the majority of cup holes at Juffain are found collectively. This concentration of cup holes leads to the designation of cup holes as centers.

Next in prominence at Juffain are the Q - Quarries. Throughout the Juffain Dolmen Field, bedrock that has been cut is noticeable. In five areas it was highly conspicuous, even the stages of the quarry process were apparent. All of these quarries were discovered in connection with dolmen construction. The cutting and movement of the large stones cut from bedrock must have required a great quantity of manpower. For this reason, they are designated as centers. The Sq - Square is another important designation at Juffain. Circles are commonly found associated with dolmen fields; this is not the case with square walled in areas. The three squares documented, had large walls and even though they are designated as squares, in each case certain walls were curved and corners often obscured or having cairns resembling towers. In two cases carefully prepared gates were visible and areas cobbled. Small walls were also associated with the square that appeared to be domiciles. One other form of center may be designated once the maps are analyzed. The vast quantity of tumuli, in large groups, appears to be collective ritualistic centers.

The holistic nature of research at Juffain requires dolmens be redefined in relation to other megalithic structures. Definitions must be flexible as new architectural components and purposes are recognized. Dolmens are highly complex and though much is known much more is questionable or unknown.

The definitions provided in this article are a reflection of structural designations at Juffain. Definitions and designations will change as new understanding is amassed. Re-designation of structures is expected.

One example of re-designation became clear, when four walls were recognized to form a distinct square, then designated Sq, for Square. A relook at walls documented earlier also showed a distinct square. Those walls were then re-designated as a square.

Archaeological data are inherently spatial, and archaeologists are naturally concerned with the distribution of archaeological sites across the landscape. From these distributions, described as settlement

patterns, we can infer a great deal about the social and political complexity of the ancient people's we study, the size of their domains, aspects of resource procurement. GIS can be used as a database management instruments of great flexibility, they have been applied with greatest success to regional-scale archaeological survey, which is the systematic search for archaeological sites on the landscape.

*Table 1. Structure types and quantities caption.*

Designatio	Type of Structure	Quantity
D	Dolmen	145
TU	Tumulus	51
T	Tomb	14
PA	Patio	6
W	Wall	56
CA	Cave	10
CIS	Cistern	4
S	Silo	3
P	Press	6
QS	Quarry Stone	14
C	Circle	29

SS	Standing Stones	27
CH	Cup Hole Center	10
Q	Quarry	5
Sq	Square	3

It would be impossible to answer questions about structures by relying on a field survey alone. However, GIS method used to develop new insight about the discovered structures in the site, exam certain hypotheses, study elements and validate fieldwork. This research project demonstrated the applications of GIS in documentation archaeological structures. In this case, GIS was used to store field data in a digital format, giving the analysts the ability to integrate and manipulate the stored data as they worked in the field. As new field data were acquired they could be stored directly into the GIS together with pre-existing data (Figure 4 and 5).

Architectural Components are elements of a dolmen and are mentioned throughout this article they are: balancing stone, blocking stone, casting mound, chamber, curb, divider, dolmen wall, end stone, floor, sub-floor, passage, patio, pillar, platform, porthole, ramp, retaining wall, side stone, steps, terrace, threshold, top stone, tumulus and window.

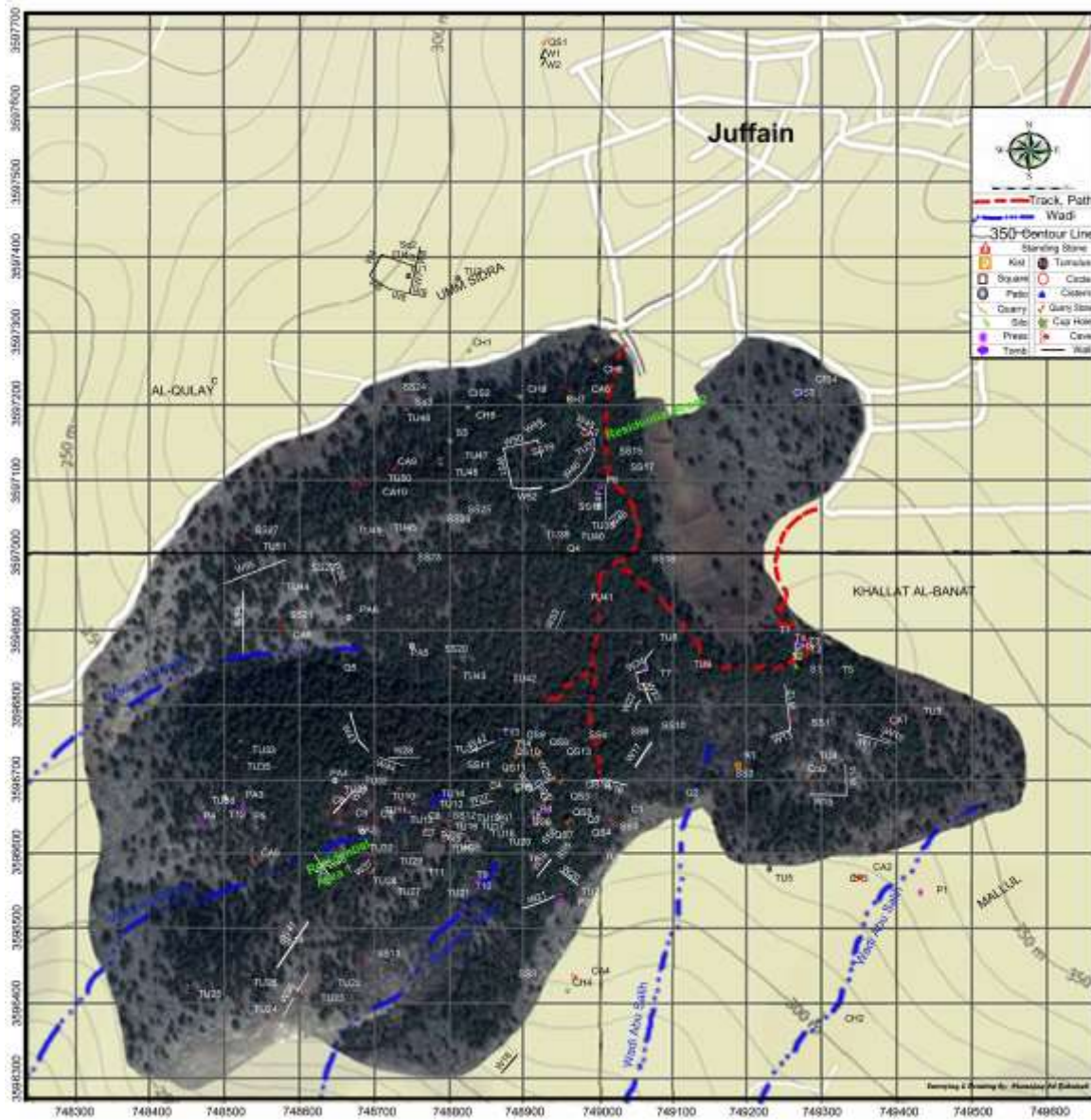


Figure 4. Juffain Dolmen Field Map showing all the documentation of all discovered structures.



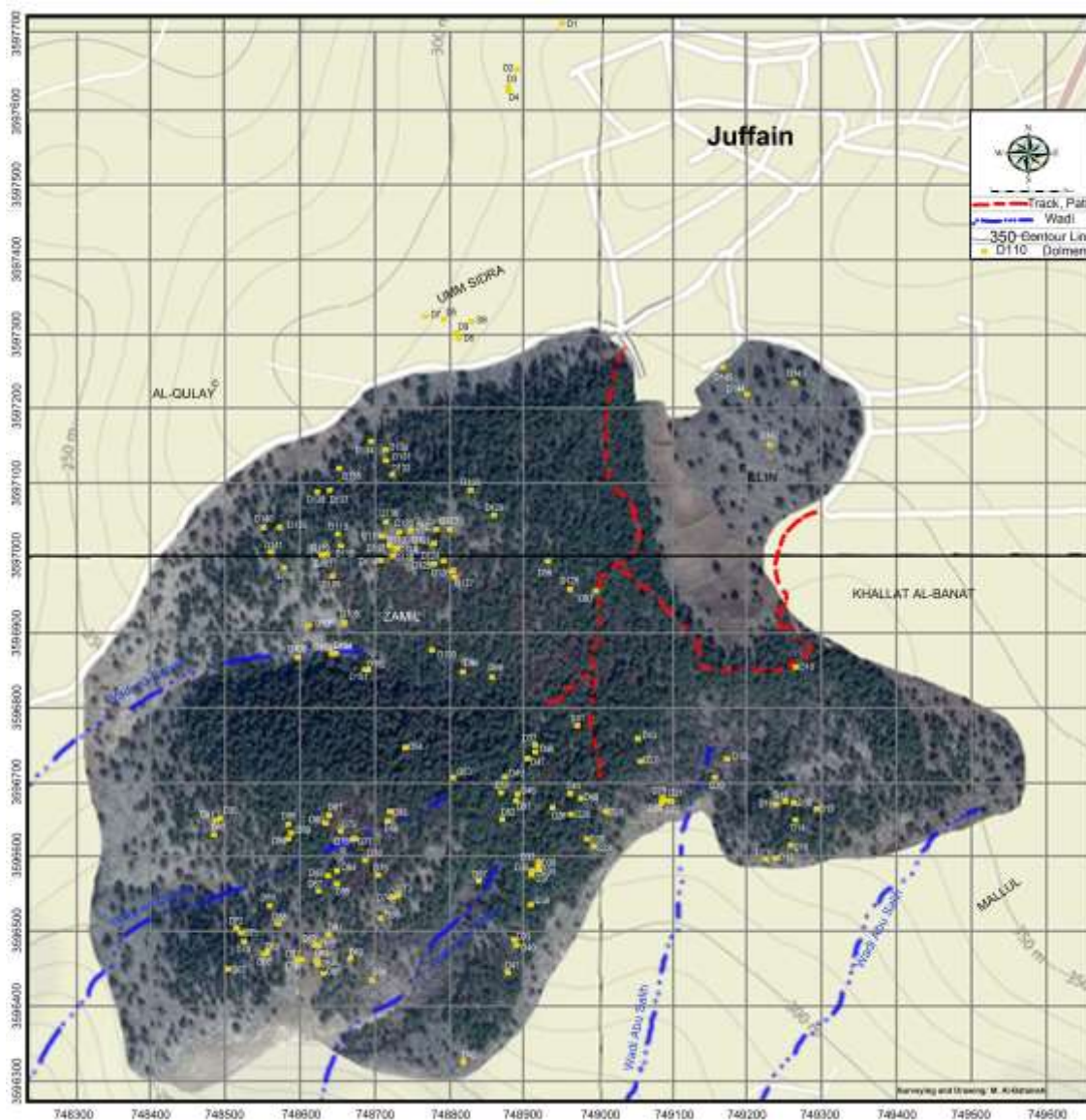


Figure 5. Topographic Map showing dolmens position and its elevation.

### 3.1. Dolmen.

Dolmen: a stone table originating from the Breton "taol maen." A dolmen is a type of megalithic (Greek: magus meaning large and lithos meaning stone), monument built with rough-stone construction, in which a number of upright stones (side stones) form an open or closed chamber of dry stone (undressed) construction, that support a top-stone or stones (roof). A dolmen may or may not have a combination of the 24 architectural components, and it may be covered in a tumulus. In other languages the dolmens are called: Hünenbett (German), Cromlech (Welsh), Anta (Portugal and Spain) and Goidol (Ko-

rea). It is not a dolmen if there is no top stone or it is constructed using dressed stones. If this is the case, they would typically be another type of structure. Exception to these rules is, the F Type dolmen may or may not have a top stone and technically speaking a porthole is carved or dressed component. The A Type dolmen is often referred to as a trilithon, it is the smallest and simplest form of dolmen constructed out of three stones, two side stones and a top stone. Common variations including: end-stone, floor, sub-floor, multiple top-stones, platform and window, Fig. 6 and 5.



Figure 6 . Juffain Representative A Type Dolmen.

The B Type dolmen, in its simplest form, is built with a long chamber consisting of four or more side stones and multiple top-stones Fig. 7 and 8. It is typically elongated because of multiple side stones. Common variations include: end stone, ramp, passage, blocking stones, floor, sub-floors, platform, and window. Drawings 1 and 2, are by K. Schath (TBP) adapted from (Zohar, 1992: 44-45), and depict the A and B; C and D type dolmens in their simplest form. They are a departure from the long standing drawings of Zohar who added components to his drawings making them ambiguous. The addition of Architectural Components to main Type has the potential of changing the significance if not use of that dolmen.



Figure 8. Juffain B Type Dolmen.

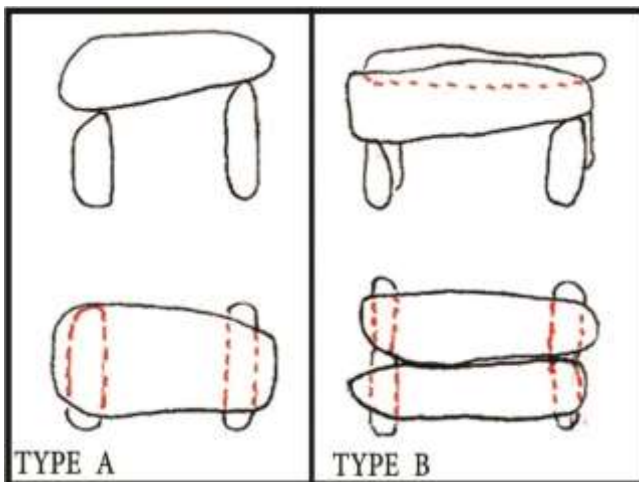


Figure 7. Drawings of A and B Dolmens type.

The Type C dolmen is rarely found and is actually a false corbelled dolmen having stones placed on top of each other like stairs but does not have a true arching appearance. The dolmen does make use of a capstone which holds the counter levered stones in place, (Fig9 and 10). The ones found at Juffain have globular side stones. As seen in Figure 7, it is not truly counter levered or false corbelled it is usually found with a platform.



Figure 9. Juffain C Type Dolmen.



The D Type dolmen has double chambers with the chambers being side by side, usually built with two outside side stones and a single divider in the middle and one top-stone. The main defining architectural component of this dolmen is two chambers side by side (Fig. 10).

At Juffain the D Types are a variation of that, making use of four side stones or two top stones Fig.11. There are also true D Type dolmens at Juffain. The D Types at Juffain also have very special architectural components only seen there and must be studied in depth.

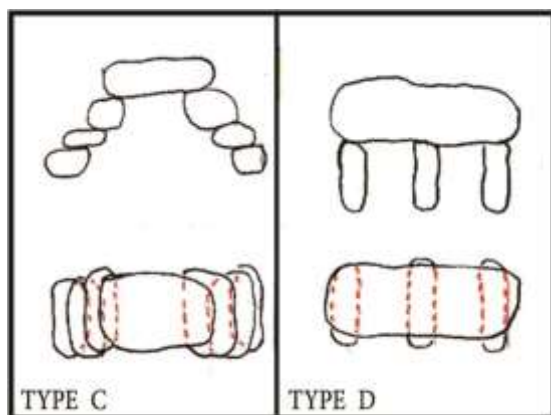


Figure 10. Drawings of C and Dolmen type.



Figure 11. Juffain D Type Dolmen.

#### 4.1. Tumulus

**Tumulus:** (too-myuh-luh s, tyoo-) noun, pl. **tumuluses, tumuli** (too-myuh-lahy, tyoo-) (1) *Archaeology.* An artificial mound, especially over a grave; barrow. (2) *Geology.* A domelike swelling or mound formed in congealed lava. Origin, Latin: mound, swelling, equivalent to *tum(ēre)* to swell + *ulus* ule. (Based on Random House, 2017).

This term is used for a pile of stone that is associated with dolmens or tombs Fig.12. They are most

often found with a well-defined platform and possibly a smaller curb to hold the stones in. A tumulus will often contain an internal monument or grave. Without association with dolmens the pile of stones would be called a cairn.

At Juffain each group contained at least one tumulus. With 51 Tumuli, there is a ratio of approximately 1 : 3, tumuli to dolmens. This is a very high quantity of tumuli within a megalithic field and ratio to dolmens. Two possible factors accounting for this are; 1. The tumuli played an extensive role in the ritualistic practices at Juffain and 2. Due to the occupation during the Byzantine and Roman periods some of the tumuli could be towers or cairns.



Figure 12. Image of Tumulus at Juffain.

#### 3.3. Tomb.

**Tomb:** (toom) noun, pl. **tombs** (1) an excavation in earth or rock for the burial of a corpse; grave. (2) a mausoleum, burial chamber, or the like. (3) a monument for housing or commemorating a dead person. (4) any sepulchral structure. Origin, Middle English *tumbe*, Anglo-French; Old French *tombe*, Late Latin *tumba*, Greek *týmbus*: burial mound; akin to swell. (based on Random House, 2017). Fourteen tombs were documented, with indications that many more were to be found. Both Roman era and ancient tombs were discovered, but without excavation the tombs dating of the tombs will remain uncertain, Fig. 13.

EB I tombs are very common in or around dolmen fields and Juffain is certainly not exempt. The mention of the tombs around dolmens is neglected by most scholars and any connection is scarcely mentioned.



*Figure 13. Tomb at Juffain site*

This site comprises a collection of ruins of various structural remains, considerable collections of stones, were uncovered, together with plenty of ce-

ramic shreds from different area. These ceramic shards belonging to different periods of time see Fig. 14, 15, 16, 17 and 18.



*Figure 14. Late Roman -Early Byzantine ceramic sherds from tomb.*



Figure 15. Late Roman -Early Byzantine ceramic sherds from tomb.



Figure 16. Roman ceramic sherds from tomb.





*Figure 17. Byzantine ceramic sherds from tomb.*



*Figure 18. Late Roman -Early Byzantine ceramic sherds from tomb.*

On the basis of the typological features of the ceramic assemblage, the site was attributed to the second phase of same culture (although two phases of the site were analyzed, see Table 1). The remarkable variety of Tripolitan pottery in terms of forms and decorative patterns has allowed the development of one of the most impressive and reliable relative chronologies in European prehistory.

Technology, form, and ornamentation have been used to define cultural and chronological properties of archaeological sites. It is indeed by distinguishing between technical and technological, morphological, functional, and stylistic indicators, noting that the

former are more conservative and the latter more dynamic, that genetic connections between different groups can be identified

Patio: (pat-ee-oh, pah-tee-oh) noun, pl. patios (1) an area, usually paved, adjoining a house and used as an area for outdoor lounging, dining, etc. (2) a courtyard, especially of a house, enclosed by low buildings or walls. Origin, Latin *patitus*, to lie open. (Based on Random House 2017). As an “architectural component,” this definition is appropriate and is an example of how detailed terminology for dolmens can bring their use to light. The patio is seen as a gathering place near the dolmen possibly for rituals.

### 3.4. Wall.

Wall: (wawl) noun, pl. walls, (1) any of various permanent upright construction having a length much greater than the thickness and presenting a continuous surface except where pierced by doors, windows, etc. used for shelter, protection, or privacy, or to subdivide interior space, to support floors, roofs, or the like, to retain earth, to fence in an area, etc.

(2) a rampart raised for defensive purposes, (3) an immaterial or intangible barrier, obstruction, etc., suggesting a wall, (4) a wall like structure, enclosing part, thing, mass, etc. Origin, Middle English; Old English w(e)all Latin vallum palisade, derivative of vallus stake, post. When found in a megalithic field the wall is usually some form of boundary and primarily marks a group area rather than providing defense. Wall are constructed in many various ways, Large and small stones, connected and separated stones, a line of stones with bedrock, single or double rows of stones, in situ at ground level or above. The boundary wall is often built with stones to form a virtual barrier, as in definition three.

At other times the wall is used to form a distinct border and is usually built using large stones or a double row with fill. These walls are prominent and used to divide a village or denote a common center.

Several dolmen groups at Juffain have formidable walls on their border. One hill, in the greater megalithic field has a wall dividing it that exceeds 250 meters long (see Figure 19).

#### *Ceramic Typology*

This study represents an attempt to establish a ceramic typology for the excavated ceramic sherds. The typology is based on the study of Many types exhibited variation in decorative treatment that could be subdivided as distinct subtypes deriving from the basic type. For example, the type Red Rim is defined by its polished orange slip and a red painted band on the rim. When it occurs with only these decorative elements it is classified as the sub-

type ("simple"). This basic subtype, however, is often elaborated using such techniques as incising (usually in a horizontal panel that is painted brown/black), or different degrees of painted decoration (ranging from simple horizontal bands to complex polychrome motifs). Yet regardless of the degree of elaboration, the fundamental attributes of the type are maintained. Subtype variation can thereby be discriminated without losing the underlying consistency of the type identity.

About 22 potsherds were analyzed from the excavated site. Samples were selected on the basis of their typological and stylistic variations, in order to provide a representative sample for most typological categories, or to cover most of the typology and different surface treatments represented in the excavated material from each site. Three main bodies of ceramic types can be distinguished during the period of time studied. The first corpus, for which the term "late Roman and early byzantine" is suggested, is characteristic of the fourth to sixth centuries C.E. These types were replaced in about the middle of the sixth century C.E. by a new ceramic repertoire that remained current through the seventh century C.E. The term "Byzantine" is suggested for the mid-sixth through seventh century C.E. corpus of types. The third is principally of the Roman period (1st cent. BC - 5th cent. AD).

Classification of the ceramic assemblage identified 7 major pottery types (Table 2), with an additional 3 minor types that were either foreign imports or else were anachronistic, i.e., from a time period other than the Postclassical. The assemblage described above contained a large repertoire of vessels of daily use that were uncovered on the margin of one of the dwelling quarters of the city of the Roman period. This deposit contained mainly storage and cooking vessels. By examining each of the types, we could establish that their range of use was the second half of the 2nd century and the beginning of the 6th century CE.

Table2. Ceramic typology.

Site: Juffain2017	Object No	Material	Classification	Typology	Figure No	Chronology	Remarks
	No1	Pottery	Base	Bowl	F.12	L.Roman-E.Byzantine	Fragment
	No2	Pottery	Base	Bowl	F.12	L.Roman-E.Byzantine	Fragment
	No3	Pottery	Handle	Jar handle	Fig.13	L.Roman	Fragment
	No4	Pottery	Base	Amphora	Fig.13	L.Roman	Fragment
	No5	Pottery	Handle	Jar handle	Fig.13	L.Roman	Fragment
	No6	Pottery	Handle with body	Jar handle	Fig.13	L.Roman	Fragment
	No7	Pottery	Handle	Jar handle	Fig.13	L.Roman	Fragment
	No8	Pottery	Rim with body sherd	Bowl	Fig.14	Roman	Fragment
	No9	Pottery	Rim with body sherd	Bowl	Fig.14	Roman	Fragment
	No10	Pottery	Rim with neck	Jar	Fig.14	Roman	Fragment
	No11	Pottery	Rim with neck	Jar	Fig.14	Roman	Fragment
	No12	Pottery	Handle with body	Cooking pot	Fig.14	Roman	Fragment
	No13	Pottery	Rim with neck	Bowl	Fig.14	Roman	Fragment
	No14	Pottery	Handle	Jar	Fig.14	Roman	Fragment
	No15	Pottery	Body sherd	Jar	Fig.15	Byzantine	Fragment
	No16	Pottery	Base	Large bowl	Fig.15	Byzantine	Fragment
	No17	Pottery	Handle	Jar	Fig.15	Byzantine	Fragment
	No18	Pottery	Rim	Large bowl	Fig.15	Byzantine	Fragment
	No19	Pottery	Rim with body sherd	Bowl	Fig.16	Late roman-Early byzantie	Fragment
	No20	Pottery	Rim with body sherd	Jar	Fig.16	Late roman-Early byzantie	Fragment
	No21	Pottery	Rim with body sherd	Jar	Fig.16	Late roman-Early byzantie	Fragment
	No22	Pottery	Rim with neck	Jar	Fig.16	Late roman-Early byzantie	Fragment



Figure 19. Boundary wall found in juffain area.

3.5. Cave.

Cave: (Keyv) noun, pl. caves, (1) a hollow in the earth, especially one opening more or less horizontally into a hill, mountain, etc. (2) a storage cellar, especially for wine. Origin, Middle English, Old French, Late Latin cava (feminine singular), Latin

cava neuter plural cavum hole, noun use of neuter of cavus hollow (Based on Random House 2017). At Juffain many of the caves have openings that are carved into the rock, which demonstrated that they were used in some capacity, Fig. 20.



Figure 20. Cave found in Juffain area.

3.6. Cistern.

Cistern: (sis-tern) noun, pl. cisterns, (1) a reservoir, tank, or container for storing or holding water or other liquid. Origin, Middle English, cistern (e) Latin cisterna, equivalent to cist (see cist). (based on Random House, 2017). An underground reservoir for rainwater. Because of the heavy pine needles and underbrush covering the ground and bedrock extensive cleaning and clearing must be accomplished before archaeologists can explore and determine the full extent of the cistern systems Fig. 21.





Figure 21. Cistern found in Juffain area.

### 3.7. Silo.

Silo: (sahy-loh) noun, pl. silos (1) a structure, typically cylindrical, in which fodder or forage is kept, (2) a pit or underground space for storing grain, green feed, etc. Origin, Spanish: place for storing grain, hay, etc., orig. subterranean Fig.22. (Based on Random House, 2017). In the Juffain Dolmen Field, three of these features were discovered. One of the silos was also found to be plaster lined.



Figure 22. Silo found in Juffain area.

### 3.8. Press.

Press: (press) verb, pl. presses (1) to act upon with steady applied weight or force, (2) to compress or squeeze, as to alter shape by pressure: to press grapes. Origin, (noun) Middle English press (e) throng, company, trouble, machine for pressing, clothespress, Old French presser, Latin, pressure to press. (Based on Random House, 2017)

In the Juffain Dolmen Field presses are found cut into the bedrock and natural cup holes were utilized with these. Two types of presses are found at Juffain, the Byzantine Wine Press and the more ancient presses.

Press Wheel: On the far northern side of the Juffain dolmen field a large grinding wheel, which is thought to reach back to the age of the Byzantines

Fig. 23and 24. It was discovered near a large dolmen and was found in two pieces.



Figure 23. Ancient Press found in Juffain area.



Figure 14 Byzantine Wine Press found in Juffain area.

### 3.9. Quarry Stone.

This large stone, possibly a top stone was found propped up on one large round stone, in what could be preparation to be moved. They look much like a dolmen, at first glance, but are far from complete Fig.25.





Figure 25. Quarry Stone in juffain area.

### 3.10. Circle.

Circle: (sur-kuh l), noun, pl. circles (1) the portion of a plane bounded by a curve, (2) any circular or ring like object, formation, or arrangement: a circle of stones. Origin, Latin, *circulus*, replacing Middle English, *cercle*, Old French, Latin.

Two type of circles are found throughout the Juffain dolmen field. The first type, is more rounded and is constructed with a series of small to large stones, at or above ground level. It is another feature that is commonly found near dolmens. These circles are thought to be meeting places or used for livestock. Only excavation will tell us Fig. 26.



Figure 26. Large Circle in juffain area.

The circles, though mentioned by many scholars, scarcely any published information is available to discern what they are used for. (Stekelis, 1961: 52, Prag, 1995: 3, Conder, 1889: 8 and 104)

The second type, of circle stand out for their resemblance to round houses (Mazar 1992: 116, 155-156). These structures make use of cut or natural bedrock in addition to rows of stone. A. Mazar shows a photograph of circles, though looking much different than that in (Figure 18), one groups at Juffain is similar (1992: 156, 5.3). The Photograph in (Fig. 27) is very similar to the ones shown by Mazar,

(1992: 116 and 155). Compared to A. Mazar, one interesting difference stands out, two areas showing these type of structures significant boundary walls are present.



Figure 27. Domicile Circle in juffain area.

### 3.11. Standing Stone

Standing Stone: meaning a stone of some size, purposely erected, (Scheltema, 2008: 18). This definition seems appropriate, but is not as descriptive as Menhir: (men-hir), noun, Archaeology, (1) an upright monumental stone standing either alone or with others, as in an alignment, found chiefly in Cornwall and Brittany. Origin, Breton phrase, *men-hir*, equivalent to *men* stone + *hir* long, (Based on Random House 2017). thought to mark a clans' area, (Clayton, 2006).

In Scheltema's definition of standing stone he writes, "of some size," this is significant for two reasons: first, these stone are usually very large and stand out for their prominence, (this is the case for some standing stones at Juffain, but the majority are rather diminutive), second, it does leave room for the designation of standing stone to be applied to the smaller stones Fig.28. At Juffain the smaller standing stones remain a debatable entity (are they placed there or just natural stone formations?). Many of these stones are conspicuous for their location and relationship to other features. Because of their size, they were re-designated as "boundary stones." The Juffain Field contains many walls from 5-200 meters long, which are thought to be boundaries. Many times boundary stones are incorporated into boundary walls to separate dolmen groups.





Figure 28. Standing Stone in Juffain area.

### 3.12. Cup Hole or Rock marks

“Cup mark” Small hollow made in a slab or rock. Often grouped together, these indentations result from repeated ritual gestures, the significance of which is unclear (Mohen, 1944: 161). Cup Holes are a common fixture of dolmen fields, (Conder, 1883, Glueck, 1959, Kafafi, Scheltema, 2005). The discussion of how they were used is quite speculative, see the above articles. Because of the large groups of Cup Holes discovered in the Juffain Dolmen Field their use may be clarified.

Cup Holes or rock marks are usually found in small quantities, even singularly, but at Juffain. the cup holes are found in large collective groups, often with a press, silo or cistern Fig. 29. Because of the large size of these groups, they are seen as a form of center or gathering place.



Figure 29. Cup Hole center at Juffain area.

### 3.13. Quarry

(kwawr-ee, kwor-ee) noun, pl. quarries. (1) an excavation or pit, usually open to air, from which building stone, slate, or other like is obtained by cutting, blasting etc., (2) an abundant source or supply. Origin, Middle English, *quarey*, Medieval Latin, *quareia* variant of *quareria*, Old French, *quarriere*,

where stone is squared. (Based on Random House, 2017). In the Juffain Dolmen Field, stone with striation from being cut is distinct. In, Figure 30, the stone along the break at the scale, clearly corresponds to the stone adjacent to it. Grooves that have been put into the bedrock where it is to be cut is also conspicuous. The cut stones are sorted (both small and large stones), placed as if ready to be moved, all parts selected for a dolmen and stacked. Many of the larger stones were propped upon a round stone or on top of one another like toppled dominoes.



Figure 30. Cup Hole center at Juffain area.

### 3.14. Square

(skwair), noun, (1) anything having this form or a form approximating it, as a city block, rectangle piece of candy, etc. (2) an open plaza in a city or town, formed by the meeting or intersecting of two or more streets... in the center.

The square is a new feature of dolmen fields and gives it considerable importance. Viewing it as a plaza, and meeting place is a logical deduction since it seems in two of these square related circles were discovered. It becomes critical to perform further research for the squares in the Juffain Dolmen Field.

## 5. DISCOVERIES

In this study about five major discoveries in relation to dolmens. They are important for the understanding of dolmen groups and their social spatial relationships. Though many of these features are acknowledged as related to dolmens, they have never been seen in such concentrated groups. The following are the Dolmen Heritage Park Juffain, 2017 project discoveries: (1) Quarries, (2) Cup Hole Centers (3) Domestic Meeting Places, (4) Ritualistic Centers, and (5) Borders and Boundaries.

All of these features, many in each of the dolmen fields, can be seen as belonging to autonomous clans and becomes a geographical question, (Renfrew, 1984: 26). The topographical nature of the “Discrete

Dolmen Fields<sup>1</sup> shows that each of the isolated hills is significantly separated from other groups in the greater megalithic field, (Clayton 2007, Schath et al 2012). A more important aspect of these discoveries is the character of collective meeting places within this dolmen field, (Renfrew, 1984: 54).

### 5.1. Quarries:

These are work spaces and documented in six separate areas within the Juffain dolmen field. Quarry operations correspond directly with dolmens and where they were standing and being built. Scholars write that the stones, being very heavy, are quarried where the rock is available and are moved downhill and possibly make use of a ramp to place them on top of the dolmen, (Swauger 1996:108; Kafafi and Scheltema 2005: 6, and Zohar 1992: 47).

The discovery of the quarries at Juffain is remarkable, because the stages in cutting and preparing stones was unmistakable. Cut rock was visible in the whole area and the striae were prominent. Some large stones were being cut and others had been cut from the bedrock and separated.

In the same quarry, stones appearing to be top stones were balanced on a single large stone, as if waiting to be moved. Others stones were moved and seemed to be sorted by component to be used in making a dolmen. Further studies should illuminate the exact method of cutting how they were moved and selected.

### 5.2. Cup Hole Centers:

Cup Holes have always been associated with dolmens and understood to have some important function, even if not fully understood. Two scholars that expound on cup holes, and how they relate to the dolmens and also attempt to lay out arguments for their use. Many of their ideas are still in discussion and many have merit. They both see them as, not being natural (which could be argued) and point out they are often found on the top stones of dolmens. The collection of water or processing of other liquids is also mentioned along with the standard ritualistic use, (Scheltema 2005: 23-25 and Conder, 1883: 228-231).

Cup Hole are usually found isolated, one or two at a time. Though they can be found singularly at Juffain, the vast majority are found in large groups, averaging fifteen cup holes. There are seven Cup Hole Centers throughout the entire field, and why

they were designated CH, Cup Hole Centers as collective features.



Figure 31. Cup Hole Center.

These centers have cup holes of varying sizes, with many holes having rivulets running from one hole to another. Scheltema points out, there are two types, the first; round and conical, showing their use for grinding and second, larger and shallow with flat bottoms, possibly for processing liquids, (2005: 23-25).

More suggestive of the collective nature of these centers, is the use of the cup holes, presses, cisterns, and silos in combination with each other.

### 5.3. Domestic Meeting Places:

Those areas where people of different groups characteristically come together naturally become a place of common meeting. Discovering these places is tantamount to authenticating the theory put forward in the proposal (Schath 2017). It goes even farther by establishing the first axiom of sociopolitical organization. "The human social group is defined by the habitual association of persons within a territory." (Renfrew 1984: 54).

The Greater Megalithic Field at Juffain is the first Dolmen field where multiple separate groups have been established. Further analysis of the maps and distribution will provide evidence of the exact number of groups. Of the six separate areas, the people in three, are forced by topographical features to cross a flat and open common area. One of the quarries and a cup hole center is found near this common point.

Two of the large squares are constructed with of large or double rows of stones. In both cases these heavy walls enclose the entire space with the help of virtual walls. On one side there seemed to be significantly smaller walls. Both squares showed signs of small gates and at least one internal tumulus. Indication of dwellings were identified along one wall, much like the structures in the Negev (Mazar 1990: 114-117).

<sup>1</sup> Discrete Dolmen Group is a term coined by K. Schath to describe a single dolmen group, that is part of a much larger field (greater megalithic field), having at least two complete dolmen groups.





Figure 32. Domicile Circle.

Near two of the other large squares were many small ovals (round houses?). They were aligned along one of the large walls and at intervals. Perpendicular walls extended five to ten meters into the square at several points. At other points very distinct gates were found along the wall. Some of these gates had inset walls and some were identified by two large stones and a gap. In addition to the gates at certain intervals large stones (boundary stones) seemed to provide markers for the area.

Of the many circles, two were very large and one seemed to be forums they had cobbled areas and some had small internal walls. When other structures nearby are considered along with the open areas it is also possible the circles could be animal pens.

With two large circles and three large squares in completely different areas of the field they most certainly had some communal purpose. Possibly fulfilling the third axiom of sociopolitical organization, "Basic social groups do not exist in isolation, but affiliate together into larger groups, meeting together at periodic intervals, (Renfrew, 1984: 54).

Because of the sketchy research of combined dolmen groups in a combined megalithic field, Juffain represents a new start for research. The mere suggestion of a Dolmen Field having these structural elements is a call for further research.

#### 5.4. Ritualistic Centers:

Each "discrete dolmen field"<sup>2</sup> in the greater megalithic field are a collection of many structures in groups. The social and cultural meaning of these groups is unknown and scarcely studied. Therefore, the ritualistic nature of the dolmen fields remains enigmatic.

Though dolmens seem to be the most likely candidate for ritualistic practices, the high quantity of tumuli leads the team to focus research on the tumu-

<sup>2</sup> The discrete dolmen field is seen as a basis for a clan. And should be seen on the map as a highly concentrated group of structures, (Schath 2017).

li as the most likely the place of meeting and ritualistic practices. The greatest collection of ritualistic structures associated with the tumuli are located near the common meeting place mentioned earlier. Also significant is the indication of avenues leading to the tumuli. Research here has implications of determining the fifth axiom of sociopolitical organization, "The effective polity, the highest order social unit, may be identified by the scale and distribution of central places," (Renfrew, 1984: 54).

#### 5.5. Borders and Boundaries

six major and five secondary valleys separate dolmen groups from each other. The valleys surround Discrete Dolmen Fields. And at least six of these groups have been identified within the "Greater Megalithic Field" Fig. 31. The Juffain Dolmen Field has both borders and boundaries and the difference is important. A border is defined as the outside perimeter of a discrete dolmen field or the greater megalithic field. This perimeter is determined by topographical features, and is augmented by large walls or barriers.

The boundary, on the other hand, is the separation between small group or clusters of dolmens within a discrete dolmen field. Boundaries are often a virtual wall, a line of stones or several boundary stones.

The "boundary stones" at Juffain are different than the large standing stones that stand out as sentinels in other dolmen fields. Boundary stones are fairly small only about one-meter high, but they are still clearly visible because they are large enough to stand out.

Borders and boundaries are crisscrossed throughout the Juffain dolmen field and will take a great deal of time to catalogue. Until the walls are documented in full, they will not be fully understood. Walls play a significant part in the Mutawwaq dolmen field and Polcaro, describes the nature of borders and boundaries well, understanding at Mutawwaq hopefully can help at Juffain, (2014: 1-3).



Figure 33. Border Wall.

## 6. RESULTS

According to the survey and the archaeological finds, it seems that the site has been settled through Chalcolithic, Bronze, Roman and Byzantine period.

Five major stunning discoveries relating to the dolmen culture is found. In rank of Importance, here are the discoveries: (1) borders and boundaries, show that each of the dolmen groups stand alone, (2) domestic meeting places point to a sedentary society, (3) quarries and cup hole centers demonstrate a high scale of distribution of central places, and (4) ritualistic centers indicates a higher level of human relationship. (5) New 54 new dolmens were identified. Furthermore, ceramic typology identified 7 major pottery types with an additional 3 minor types. The results have provided insight into the structures and dolmen types of cultural interactions and the relationship within the study area, the structural patterns is restricted to a specific community, and the location of structures responsible for the spread and maintenance of

Only uncomplicated social theory was referenced to maintain a basic understanding for complicated issues surrounding dolmens. The results ultimately suggest that social boundaries on both local and re-

gional spatial scales were open, and probably unbounded.

At issue is, can we establish that separate groups of people have common interaction in a sociopolitical organization. "Six basic principles lead to the certain association of social groups, most likely clans at Juffain. Colin Renfrew's "six axioms" in *Approaches to Social Archaeology* (1985), provide the basis of study at Juffain:

(1) The social group is identified by where they live, (2) groups will live in their own area, (3) groups will meet together regularly, (4) human nature is hierarchical, (5) the complexity of meeting places effects social status, and (6) group dynamics influences distribution of artifacts.

To recap, at least six different groups lived in proximity of each other and must come into contact. They each have their own area and they are highly organized but also share a dense collection of tumuli central to the greater field.

The basic groups seemed to share common areas such as, the quarries and cup hole centers, and cisterns were few and water most likely needed to be shared.

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