“Explicit Features” and “Latent Features”
The Case of the Final Natufian at Mallaha (Eynan)

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Introduction
The archeological site of Mallaha in the Upper Jordan valley in the Galilee foothills has been the focus of numerous excavation campaigns since those in the mid 1950s, directed by Jean Perrot. This site, which dates back to the end of the Epipaleolithic, is associated with a culture known as the Natufian (10,000-8,000 BC). As of this time, the populations of the Southern Levant went through a major socio-cultural change. Until the end of the previous Geometric Kebaran culture, populations were nomadic and their economy was based on hunting and gathering. A new lifestyle began to emerge starting with the Natufian. The Natufians, while continuing to live from hunting and gathering, ceased to be nomads. Sedentism is the first step in a process that was to develop over the course of several millennia, known as neolithization. In addition to the emergence of sedentary life, this socio-economic upheaval, or "revolution" as it is termed, was to later include the development of grain collecting and the domestication of animals.

Studies are currently being conducted on the final phase of occupation of the Mallaha site, which dates back to the Final Natufian. Until 1996, the layer corresponding to this phase was believed to be devoid of any construction. The resumption of excavations under the direction of Francois R. Valla and Ofer Marder (CNRS) and Hamudi Khalaily (Israel Antiquities Authority) revealed, however, a stone architecture similar to that found in ancient layers.

The Mallaha buildings, which were semi-subterranean, semi-circular and circular, were the key features in determining sedentism. They have always been interpreted as dwellings. The current excavation campaign of the Final Natufian constructions and their floors appears to contradict this hypothesis. It would appear that not all had the same function. Their internal organization differs. Some are so crowded with structures of minor importance that it is difficult to see how they could have been dwellings. This observation leads to suspect specialized functions.

Initially, my research was aimed at describing this new architecture. The goal consisted of accounting for construction elements found during the excavation: walls, postholes, etc. which form the framework. In addition there are deliberate clusters of objects that were abandoned on the floors by prehistoric peoples. The whole constitutes what A. Leroi-Gourhan calls "explicit features".1

In Mallaha, it was the massiveness of these constructions in the Early and Late Natufian which prompted J. Perrot to believe that the inhabitants of the site could have had a sedentary life style. Up to the present day, in the absence of architecture, the Final Natufian, is the material that we can identify as "explicit features".1

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Natufian was considered to indicate a return to nomadic life. Do the new constructions warrant a rethinking of this point of view? This is the question motivating their description.

However, it appears critical to go further in the study of the constructions. If the floors can, in fact, be identified, perhaps objects abandoned by chance during day-to-day activities are not distributed randomly, and perhaps their distribution reflects something of the activities that took place in these buildings, and the organization of these activities. The search for this hidden structuring, A. Leroi Gourhan’s "latent features", calls for the recording on a grid and the analysis of all the artifacts whose clustering or scatter are likely to be indicative of a behavior. This analysis can yield information on the function of the buildings, confirming or disconfirming their possible specialization. The data can also potentially reveal a division of labor in space, and thus provide an idea of the small group of individuals who spent time each building at a given time. Finally, there is the hope of finding solid evidence that can support claims concerning the length of occupation of each floor.

Field Methods

Interpreting both explicit and latent features depends on observations made in the field. In Mallaha the layer corresponding to the Final Natufian is a dense gravel in which the walls, themselves made of stone, are not always easy to identify. At the top of the layer, the clearest constructions appear as curved alignments of blocks of fairly large stones emerging from a sea of smaller stones. Careful examination shows that inside these curves, there are slightly fewer stones than outside. This situation suggested an initial approach consisting of excavating the stone alignments by digging inside the spaces they seemed to border. This tactic was concordant with what is known about earlier constructions, which were dug out and lined by a low supporting wall. By going down into this fill, new arrangements of stones were found, alongside objects that helped define the surfaces interpreted as being floors. The main difficulty was identifying the edge of the floors where they did not abut onto the walls, which are all open wide. Lastly, drawing on experience, it was realized that next to the constructions that were the easiest to identify because they were the most carefully built or were made of blocks that were much bigger than the average stones, there were other arrangements made of regular size blocks or loosely ordered ones.

Once the risky approach and recognition stage was over, recording of the "explicit features" does not, theoretically, raise very difficult problems. Drawings, photographs and altitude measurements are routine procedures. This is not the case for the "latent features". As said earlier, these structures are not visible during excavation. They need to be revealed afterwards. But the efficiency of the operation depends on the systematic, and in a sense blind, collection in the field of information that only take shape in the laboratory after patient analyses. In theory, to guarantee the objectivity of the results, all artifacts must be recorded individually in three dimensions with the exception – perhaps – of miniscule debris recovered by sifting in as limited as possible units in surface and depth. This should yield the best control and hence the best guarantees that the maps obtained in the end correspond accurately to the state in which the site reached us. A state which will later need to be discussed on the basis of the observations as a whole to
determine to what extent it corresponds to the state in which the prehistoric people left the site, or whether it corresponds to later disturbances.

Theory, as we all know, is sometimes difficult to put into practice. In Mallaha, as is the case in most of the large Natufian sites, the state of the sites is such that a complete recording is almost impossible to achieve. There are so many objects, and many are so small, that keeping them in their locations in the course of excavation, or even systematically recording them on a map would slow down the work to such an extent as to make it inefficient: one would lose the overall picture and become mired in insignificant details. The fill in the constructions, which is stuffed with objects, would take more time than the floors and they might be overlooked, mixed into the mass of sediments that are never sterile. Only a deliberate and selective approach (the exact opposite of blind recording) makes it possible to identify them. Outside of the constructions, a full recording would be meaningless. There is, in fact, no hope of revealing an organization testifying to human activities in the amorphous mass of gravel where no floors, except on rare occasions, can be identified.

The methods thus needed to be adapted to the site, and to the ultimate aims of analysis, which remains the behavior of the Natufians. Two procedures were adopted. In the constructions, including their fill, any somewhat large object, and in any case objects that were thought to be indicative of the floors, were recorded on the maps. The others were recovered by sifting by units of 50 cm$^2$ to a depth of one to two centimeters. These units were later combined according to the somewhat arbitrary thickness assigned to the floor at each spot. This yielded distributions that associate different degrees of accuracy: some objects are pinpoint-located but the location of the vast majority is only known through the artificial framework of the map. Naturally, the material associated with each units however small it may be, is isolated. This method only provides analysis a relative degree of precision but it has been proved efficient. According to calculations by certain authors, the loss of information in this case is statistically negligible compared to total accuracy, doubtless much more satisfying for the intellect.

In a behavioral study, the gravel, far from being a space devoid of interest, represents an important pole as contrasted with the interior of the constructions. In theory, one might expect to find a zone where the objects are in general fairly scattered, but with concentrations of waste thrown, perhaps, into pits. In fact, there is a thick mass of sediment and gravel in which enormous quantities of archeological material of all sorts is mixed up with no visible organization when being excavated. Given the size of the areas and the volumes (the gravel on the average is more than 50cm deep), that need to be processed, because in addition the top of the gravel has been exposed for a long time and has most probably been rearranged by both the elements and by man, it was decided to dig by units of one meter square by ten centimeters in depth. Later, when discontinuities were observed in this amorphous mass, the units were reduced to one-fourth of a square meter by 5cm in depth. This procedure led to a loss of information but it was probably the only way to progress in work which otherwise would have been bogged down.

**From the field to the distribution maps**

There is no need here to go into detail on the analyses that led to the distribution maps of the objects assigned to classes likely to reflect different activities. It suffices to say that at the conclusion of these studies, the objects were classified according to their raw
material, and each group, as much as possible, was broken down into classes tentatively following the sequence of transformations, which corresponds to the use of the material in question on the site.

The flint was divided into three categories of objects, which basically reflect three moments in time in the use of this material. These were the flakes (mainly byproducts, divided into different types), manufactured tools (also subdivided) and the blocks of raw material left behind, which could either be rejects or reserves.

The fauna, basically kitchen midden, was broken down into large zoological groups: mammals, birds, fish and mollusks, which could have been used in different ways in the inhabited space. Beyond their nutritional value, some bones underwent an additional stage of processing: they were worked for transformation into tools. These were subdivided into manufacturing waste and finished objects, in general found as tiny fragments.

Large quantities of basalt were brought to the site. Here the production sequences are not well documented. There are however complete or fragmentary tools or pieces, unmodified pieces whose use is sometimes clear-cut (when they are part of pavements) and sometimes unclear, and small debris (or remains).

Once this sorting process was over, the objects were assigned to homogeneous categories. The next step was to draw up as many distribution maps as was felt necessary to reveal differences or overlaps, which would then be subjected to interpretation. Three main criteria were chosen to guide the making of these maps. The first criterion was the raw material used. The second was the function, either in the production sequence or in terms of their presumed use. Lastly we looked at whether there were contrasts simply in terms of the mass of the objects. Here, the hypothesis was that the largest pieces could have been used for specific behavior (stored? thrown away?) whereas the location of smaller pieces was more likely to reflect the place where they were accidentally dropped during work.

The "explicit structures"

The buildings of the Final Natufian in Mallaha have been described elsewhere. A brief summary is presented here. These structures can be fairly easily differentiated by their stone substructure and by the organization of small structures associated with them such as postholes and some fireplaces (hearth). Two of these, 200 and 203, share many similarities (see Figure 1, p. 52). They cover oval areas, only half of which is bounded by a wall. The other half abuts the gravel they are dug into. The walls in the shape of a half circle in 200 and 203 open northwards. They are built of blocks of lime of the same size in one row and on at least two courses. Between the two ends of the wall, domestic structures are aligned, dividing the oval area into two parts: "inside" and "frontside". In 200, a posthole, a fireplace to which is associated a pile of stone objects, a second fireplace and a set of flat slabs which look like pavement stones appear in sequence all along this axis. In 203, this same chord is occupied by two postholes. It seems that a second axis, perpendicular to the previous one and passing through the middle of the

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structure, although less well marked, contributes to the organization of space by attracting structures of minor importance as well.

This set of reoccurrences suggests a model of architectural organization. This model appears to be compatible with the functions traditionally assigned to habitations. The posthole indicates that at least part of the area was roofed, although no further precisions exist. The fireplaces suggest activities that also need to be defined. A post-excavation study of the artifacts present on the floors should confirm or disconfirm the hypothesis of habitation.

There are other structures in the Final Natufian layer at Mallaha whose function escapes us. These constructions, which are dug out and semicircular in shape, and lined on the inside by a wall of stones as in the other ones, differ at first glance by their inner organization of space they bound. For instance, in 215, fireplace 228 takes up practically all the area. Similarly, at its first state known at the moment, house 203 was crowded with four structures connected to the use of fire. Structure 202 is occupied with a kind of hearth (or oven?) around which are accumulations of burned remains. What was the function of these constructions whose inner layout is not like the previous one? There is obvious diversity reflected in the installations. Would this lead to a variety of functional hypotheses?

The search for latent structures: flint

The high number of flint objects found in Mallaha on the floors of the buildings as well as in the gravel, testifies to the intense use of this material, and probably to a lengthy occupation of the site. Flint is found in the form of various pieces. Most measure less than \(1 \text{ cm}^2\) and only weigh a few grams. There are also a certain number of larger fragments, but they are rare. The very high density of flint artifacts everywhere in the Mallaha sediment raises the question of its origin. Flint is a material used frequently by prehistoric peoples from the earliest times. In Mallaha, it is not found in the immediate environment, and hence it is clear that it was imported to the site.

The first issue emerging from the distribution of flint, in particular on the floors is connected to knapping activities. What activities do the flint fragments reflect? Were the pieces knapped in situ? If yes, was the debitage done in the "houses" or outside? And, more specifically, was part of the knapping (the most delicate or final phases) done inside while others were done outside?

In order to answer these very general questions, it is crucial to examine all the objects and classify them according to their shared features. The typological and functional differentiation of objects serves to chronologically isolate the successive products of each of the transformation stages of the raw material from the first piece removed by the knappers to the discarding of the tool, which is known as the operational sequence, the chaîne opératoire. In this sequence, customarily two broad categories of products are defined: debitage and tools. The first group includes artifacts from operations that prepare the knapped material that is likely to be shaped into tools. The second is subdivided into three groups: microliths, heavy-duty tools and a set of middle sized pieces.

Depending on the pieces found on the floors, other questions may be answered. Are all the phases of the "chaîne opératoire" represented on the floors of the buildings? Was there a selection among the products brought into the "houses"? Did the Natufians have the habit of working on flint in the same place? Did they clean up?
The features that help respond to these questions include, in addition to the identification of the pieces, their abundance or scarcity and their concentration or scatter. A large number of objects from a given category found together can indicate the repeated actions in the same place. But not all concentrations of objects are indicative of a habit of this type (was a set of flakes indicative of a stone knapping workshop or a disposal area?). If the specialization of a place in a construction, or a structure itself can be demonstrated, we may be able to reconstruct part of the organization of activities. The architectural layout of domestic structures in buildings 200 and 203 already provides some indications on this subject. Is there a connection between the arrangement of these layouts and the distribution of material on the floor? A few examples taken from the debitage products and tools found on the floor of building 200 provide illustrations of the procedure followed.

**Débitage**

*The cores*

Stonework leaves behind a block of flint called a core. Forty-five cores were inventoried in house 200 (see Figure 2, p. 54). These forty-five pieces, which provide indirect evidence for lithic knapping are not distributed uniformly. They are located for the most part in the open half (the "frontside") of the building. Here, they appear to be scattered on the edge: their distribution follows the limit of the floor bordered by the gravel. In the inside half, it was also observed that the cores are often taken between the stones of the domestic structures (slabs 227, fireplaces 222 and posthole 233) or in the small basin 226, associated with basalt objects. This basin could have been used as a store or deposit whose meaning remains to be determined. Be that as it may, the dual organization of the cores could mean, first of all that some of the pieces were rejected and secondly that others, among the larger blocks, were put aside for further use.

There is perhaps another connection with the layout of the building. No less than twelve cores are arranged around two slabs (square I/94) and four are near a large block of stone, which forms the northeastern end of the wall of the house. These two concentrations could possibly indicate the location of knapping activities.

*The flakes*

Flakes together with blades and bladelets form one of the two main categories of debitage products. These items come from the work on the core to obtain blanks for tools. The density of the flakes (concentration, piles, etc) can testify directly to the knapping activities in a given place in the building.

The study of flake distribution initially prompted a count per square and per domestic structure. This method provides a first distribution in the house (n = 2534) (see Figure 3, p. 55). It shows that taken together the pieces does not reveal any highly marked concentrations. Despite this fact, there are zones where flakes are somewhat more numerous, in particular on the edges of the floor (in the "frontpart") at the foot of the wall ("inside") and in fireplace 222.

Given this lack of pattern in the distribution landscape, we attempted to adapt methods by elaborating new discriminating criteria. We differentiated fragments from whole pieces, the burned ones from the non-burned and items in pristine condition from abraded or patined ones.
The number of broken flakes could indicate trampling, which would point to repeated passages of the occupants in a certain location. The findings do not show a distribution different from the first one. The distribution of burned flakes could reflect intentional heating to facilitate knapping or accidental heating due to prolonged exposure to fire which also does not differ from the overall distribution.

The inventory of pieces that appear to be altered, abraded or glossy can be an indication of retouching of previously used objects or post-depositional phenomena such as the local intrusion of a colluvium. Again in this case, the few retouched pieces did not show any particular distribution.

Another discriminating feature: the weight, which can lead to different clustering than for groups by number. The question is to know whether the objects were treated in an identical manner regardless of their mass. All the pieces were weighed by grid square and by domestic structure. The total weights of the flakes also do not provide a different picture than counting.

The flakes do not all weigh the same. A further step was to try to subdivide the pieces into three weight categories. The first, into which most of the pieces fall, covers pieces whose weight is less than 5 gm. The second category covers pieces between 5 and 9.9 grams (middle sized pieces) and the third includes flakes weighing more than 10 grams (large pieces). This method makes it possible to seriate the flakes by separating the pieces larger than average. The distribution of objects weighing more than 5 gm appears to show a differential distribution that was previously invisible. This could be compared with that of the cores for purposes of stressing a possible specific behavior in relation to large pieces of flint.

The Mallaha Natufians used different types of flint. C. Delage recorded about twenty varieties. This broad range of raw material reflects the wealth of the region and helps account for the range of territory frequented by the prehistoric peoples. It also raises the question of a possible choice of raw material as a function of the tool they wished to make. It has been noted for a long time that regardless of site, the heavy duty tools often used a beige, coarse-grained material. The Final Natufian in Mallaha is no exception. B. Valentin identified a specific chaîne opératoire which may correspond to the shaping of these tools and the use of associated products. On the floor of "house" 200, no very large cores appear to be connected to these large tools.

The study of the distribution of flakes in shelter 200 seems to lead to somewhat ambiguous conclusions. The fact that all stages of stonework appear to be attested may be understood as the result of in situ production. However the distributions are not very differentiated. The examples provided by the cores and the flakes, which testify to successive operations, reveal a certain identity in the distributions which is difficult to interpret. Finally, if one accepts the hypothesis that the knappers worked primarily near the two slabs in square I/94, the flakes are mostly present between the slabs and fireplace 222 (in front of the knapper) whereas the cores, that take up more space, are found on the edge of the floor near the gravel (on both sides of the knapper ??)

The Toolkit

The pieces defined as tools were worked from blanks (flakes, blades and bladelets) obtained through knapping, which were retouched to give them a specific shape for a specific function. Three main categories of tools are defined on the basis of their size:
The microliths: backed bladelets

The microliths, made out of bladelets or small flakes, are divided in the Final Natufian into two groups: geometric and non-geometric. The geometric microliths cover small armatures that are triangular, trapezoidal or crescent shape. The latter tool is characteristic of the Natufian industry. The non-geometrical microliths, which include the backed bladelets, cover a wider variety of small tools, basically represented by different types of retouched bladelets.

The backed bladelets are considered, on the basis of use-wear studies, to primarily have been part of the projectiles (either darts or arrows). What is the meaning of tools used as hunting weapons within a house? Was there a manufacturing, assembling or repair location for these tools in ‘house’ 200?

The methods used for studying the distribution of backed bladelets are the same as for the debitage. They reveal a less homogeneous distribution of these microliths than that of most of the flint items (see Figure 4, p. 57). In fact, there is a clearly identifiable small concentration in the frontside part of the house around the two slabs already mentioned and in fireplace 222. This distribution is reminiscent of that of the flakes.

The medium sized tools: the borers

Here we are dealing with another family of tools, which appear to be particularly intended for domestic activities: burins, awls, scrapers, retouched flakes and blades. These pieces, in contrast to the armatures, were not necessarily carried during distant hunting trips. It is presumed that they will be found more systematically inside the houses where they may indicate possible areas of specialized work.

The total number of borers is much lower than that of backed bladelets (see Figure 5, p. 58). Nevertheless, their distribution is not very different. It confirms the trend seen above. Once again, most of the pieces are located around the two slabs and near fireplace 222.

Researching latent features: the fauna

Animal bone remains represent, along with flint, numerically the largest category of artifacts. The bones are primarily present in the form of very broken fragments which often only measure a few millimeters. As for flint, larger bones are rare. Because of this, identification at the species level is difficult and often impossible. When this could be done (work by Rivka Rabinovich and Anne Bridault), it shows that the main animal game for the Natufians at Mallaha were gazelles, deer, boar, and fish and to a lesser extent hares, foxes, birds and rodents.
This wide variety of animal bones reflects the consumption habits of these populations, although some species may have been valued for other reasons, for instance for their fur, or predatory birds whose feathers and claws could have been used for ornamentation. As for flint, is it possible to identify specialized areas where the games were carved, cooked, eaten and discarded?

A first approach to the bones took into account the weight, which appeared more significant than counting because of the large number of millimeter-sized fragments. Weighing has the advantage of not neglecting what forms the crucial part of the material. It helps show a distribution of animal remains, which reflects the volume abandoned in the structure.

The results from weighing of animal bones yield a fairly non-contrasted distribution similar to what was found for flint. Once again we observe a larger quantity of artifacts around the two frontside slabs and inside the hearth. In order to obtain perhaps more explicit distributions, we defined distinctive criteria drawn from those used for the distribution of flint.

First of all we separated out the burned bones. Many of the bones show traces of heating. It is the color of the pieces which makes it possible to identify them. Bones whose color varies from slightly blackened to very black are considered to have been exposed to heat. Those that were intensively burned lose their color and become white. This range of colors characterizes the different degrees of heat as well as duration of contact with the blaze. The bones could have been burned deliberately if they were used as fuel, or simply heated for purposes of making a tool. The animal remains can also have been burned accidentally. The distribution of burned bones does not differ from the overall distribution of the bones.

A second attempt consisted of separating out the bones whose weight exceeded 4.5 grams to inventory them according to separate selective maps. Once again their distribution overlaps the overall distribution: the large items are basically located in the frontside half of the house and above all around the two slabs. The distribution of animal remains appears to be identical to that of the flint. The concentrations are located in the same places.

Conclusion

The examples analyzed, which dealt with certain pieces of flint and fauna, show how difficult it is to determine the organization of activities inside a Natufian house. The distributions, regardless of parameters tested, appear to be relatively homogeneous. Neither the position of the objects in the chaîne opératoire, nor their presumed function, nor their volume appear to be discriminating features. However one place in house 200 appears systematically to concentrate a little more material than the rest.

These difficulties are primarily connected to the large amount of highly fragmented material on the floors. The levels of occupation were not built up floors and the material was buried easily in the soil, simply by repeated passages of the inhabitants. It should be noted as well that what is understood as habitation floors is doubtless the result of lengthy occupations. The floors isolated by the excavation teams measure several centimeters in thickness. They do not correspond to a specific time but to several weeks, several months or even several years. An additional argument in this direction is provided by the fauna, which do not only inform us as to the diet of the Natufians but also to the duration of their
presence on each floor. Knowledge of the reproductive cycles of the animals helps
determine the season when the game was hunted and hence calculate the months the
houses were occupied. The presence of fetal bones of a boar on the last floor of shelter
203 indicates occupation in the spring. On the same floor, roe deer antlers connected to
the skull suggest a hunt between the spring and the start of winter. In structure 200, the
state of the teeth of the animals indicates that hunting could have taken place the year
round. The small amount of large material on the floors suggests that they were cleaned
regularly. It may be the case that the large items were taken outside in the gravel. The
remaining large objects would correspond to the final phase of occupation of the
building. It can be seen however that on the floor of house 200 these items are primarily
located in the "frontside" half. This material and the two slabs appear to be closely
connected. It is possible that these slabs were used as seats for the occupants. If only the
part of the house bordered by a wall had a superstructure, it may be the case that this
space, at the entrance to the 200, exposed to daylight and close to a fireplace, was the best
place for various kinds of work. This space appears to have been used for activities
related to stone knapping and the use of flint as well as for activities related to processing
of animals products. Although the probable cleaning of the floors disturbs the
interpretation, it would hence appear that there is at least one clearly defined area of
activities.

The permanent occupation of the site confounds clear-cut traces of organization. Only
multiple attempts at distribution, using different criteria as well as comparisons of the
results can lead to identifying possible "latent features". Comparison with another house
from the Final Natufian in Mallaha (203) whose architectural organization presents
similarities with house 200 should make it possible to test to what extent the conclusions
obtained in the latter can be transposed elsewhere.

The Natufian constructions are located chronologically between the base-camp tents
of the hunter-gatherers and the houses of the Neolithic villages. The occupation floors of
earlier nomads are generally much more understandable for the archeologist since their
temporary nature prevented confusion from accumulation of material. The activity zones
are clearly observable. By contrast, Neolithic houses, where the floors were sealed are
often virtually devoid of material. They were cleaned and the detritus thrown outside.

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