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PROCEDURE DESIGNING AND IMPLEMENTATION: AN EXAMPLE FROM THE UPPER DISHON BASIN INTENSIVE PREHISTORIC SURVEY

ABSTRACT. — *The planning of a prehistoric survey for a specific problematic area is outlined here. Its subsequent application to the field is described and some of the sampling methods used are discussed. Attention is especially drawn to the quick, practical test-cross technique for discerning between artifact scatters and clusters (= sites).*

INTRODUCTION

The Hebrew dictum "Think in the beginning what you will do at the end" (this is a free translation of a line from Rabbi Solomon Halevy Alkabetz's most popular hymn "Come, my friend to meet the Bride," written about A.D. 1540), ought to stand in letters of fire in front of any archaeologist's eyes more now than ever before. The good old days of excavating for the sake of excavation, or even of just revealing fascinating finds, seem to be gone for good although some archaeologists may still manage to conduct work with that sole focus in mind. The broad consensus governing the field, nonetheless, holds that archaeological enterprises nowadays are, or at least should invariably be, problem oriented (see, e.g., Hill 1970, Redman and Watson 1970, Mueller 1974, Reher 1977, Thomas 1979, Bar-Yosef and Goren 1980). This necessity appears to us more crucial now than ever before because of the following reasons.

First and foremost, many archaeologists (e.g. Binford 1964; Struever 1968) strongly feel for some time now that without aiming in advance *specific* questions at the eventual data to be procured, no *new* meaningful results, and subsequently insights, can be obtained from these data. Designing one's specific questions involves more than preapprahension of research objectives; it also involves at one and the same time preperception of the specific means by which the desired goals can best be achieved (cf. Binford 1964; Thomas 1974; Hester et al. 1975) which takes us to the next reason.

Second, a considerable number of branches of science have of late equiped archaeology, directly or indirectly, with a great many sophisticated techniques by which data can be far better analyzed than in the past, and the credibility of the analyses can be tested. In order to take advantage of one or more of such techniques, it is necessary to determine beforehand in what ways exactly will the data recovered be treated, what to observe, measure, record, etc. If the operational steps are not pre-arranged, the chances to utilize properly a technique may become nill (and see Redman 1974; Thomas 1974; Mueller 1974).

Third, as is widely known, and in particular among small and poor countries, heavy constraints on research projects are compelled by extreme restrictions of funds; and as people say; "time is money".

Each one of the above reasons by its own merit already fully justifies a careful planning of what one would like to achieve from the field and in what ways. Needless to add that all three reasons lend the case for detailed design much stronger emphasis. On the other hand, every archaeologist, like every planner in general, is aware of inescapable modifications in design that must sometimes be performed in the field in face of unexpected realities. At that junction very much depends on the power of judgment exercised by the archaeologist. Put in other words, he must find the proper ways out, so as to be able carry on with his project without ruining the design.

In view of the aforementioned principles this paper intends to discuss one experience namely the designing of a procedure for an intesive prehistoric survey in the Upper Dishon Basin and its application in the field.

DESIGNING THE PROCEDURE

The intensive survey was intended as a first step within the framework of the Upper Dishon Basin Prehistoric Project begun by the University of Haifa in summer 1979. The Upper Dishon Basin, roughly occupying some 50 km², constitutes the drainage system of Nahal Dishon still meandering among the mountains of the more western part of the Eastern Upper Galilee, or the northernmost Galilee Hights (*Fig. 1*). Elsewhere (Ohel and Bruder 1980) we have outlined the objectives of the project as well as the major criteria for the survey. We will not repeat these here but confine ourselves to the field procedure *sensu stricto* in line with those objectives and criteria.

The following aspects of information were to be extracted through first season of intensive survey according to our planning:

1. Location of every prehistoric object whether isolated or not, whether an artifact, feature, or else.

2. As full a description as feasible under survey conditions of every spot or locality's individual nature and environs.

3. Establishment of site boundaries, areas, artifact differential densities, intrasite placement of features, distances, initial impressions, and possible suggestions concerning its cultural stage (s).

4. Drawing of appropriate samples.

Consequently, guidelines for the survey team(s) were worked out in clear-cut detail including actual examples of the ways and forms all items of information should be handled and recorded (cf. Hester et al. 1975). The guidelines contained the instructions that follow:

A. On enlarged map of section surveyed:

1. marking roughly site (or cluster) boundaries by continuous line, or find-spot by a point (see below);

2. noting within boundaries of site or aside spot-point the section letter-code and serial number of site or spot in section: e.g., Y14.

B. In rectangular frames in survey notebook:

1. ID: letter designating section, and serial number of site or spot in section: e.g., Y14;

2. grid coordinates: according to map, to the nearest 100 m by longitude and latitude; when the cluster or scatter (see below) are large, the approximate center should be taken: e.g., 1946/2768;

3. altitude: of center of site above sea level according to map; when site lies on a slope, specification of altitude ranges, degree and direction of gradient is to be added;

4. area: in meters squared; when site boundaries display no geometric shape, additions and subtractions are to be made by estimate;

5. category: modified after Bar-Yosef and Phillips (1977), the following clasification was decided upon: a) *clus-*

ter (or *site)* — a well-defined artifact concentration showing considerably higher density per m² within its boundaries than beyond them in the general surroundings; b) *scatter* — an area showing relatively low artifact density per m², and in which no concentration can be discerned; c) *spot* — an artifact or feature, or just a few artifacts, or upon an exceedingly small area evidently isolated from any cluster or scatter. As can be readily noted, explicit number-limits of artifacts were deliberately avoided, our consideration being that such predefined numbers might turn out both too rigid and arbitrary. What could sometimes be regarded a cluster, though faint, in one section, could be nothing more than an obvious scatter in another. We postulated that category determination should be somewhat flexible, and incorporate some more factors than just the "magic numbers".

6. cultural stage: suggestion on basis of finds: e.g., Acheulean, Neolithic;

7. team leader: first and last names;

8. date.

C. Detailed descriptions in survey notebook:

1. site boundaries: of clusters only; if contour lines can be included, they should; length and width (in m) are to be specified *(Fig. 2)*;

2. soil: in site and environs; as far as can be judged: colour, type, contents, etc.;

3. relief and landscape: of site and environs: e.g., on slope, hill, terrace, slope's feet, in channel, etc.;

4. vegetation: in site and environs (as far as known to participants);

5. features: should be recorded wherever they are encountered; if considered ancient and within site, site boundaries are to be redrawn and features inserted in their proper places with dimensions and distances specified;

6. densities: in sites only; site to be covered by 1×1 m grid network, artifacts counted by 1 m², and recorded on an additional site drawing *(Fig. 3)*.

7. sampling: of sites only: a) *judgment sampling* (not intended for elaborate quantitative analysis but for securing a fair "representation" mainly for typo-technological purposes): artifacts from 25 % of the squares are to be completely collected (whatever seen by eye); collection to be done by density per square: from highest to lower until 25 % of squares are obtained; collected squares should be shaded on site drawing *(Fig. 3)*; *random sampling:* whole site to be sampled by sample strategy as found suitable for the specific circumstances (see Redman 1974); bags must be labelled inside and outside in strict accordance with special instructions.

Finally, it seems worthy of noting that random sampling of whole sections (a section usually representing a large topographic unit such as the southern Avivim slope, Yiron Plateau, Nahal Aviv, Baram Plateau, etc.: see *Fig. 1)* was not just overlooked but ruled out at our planning stage by intention. This in spite of the fact that it might have saved us some precious time. The main reasons for our decision were that a) we have been most anxious not to miss any one site, or even scatter, from any one span of prehistoric time throughout the Basin, and b) we have

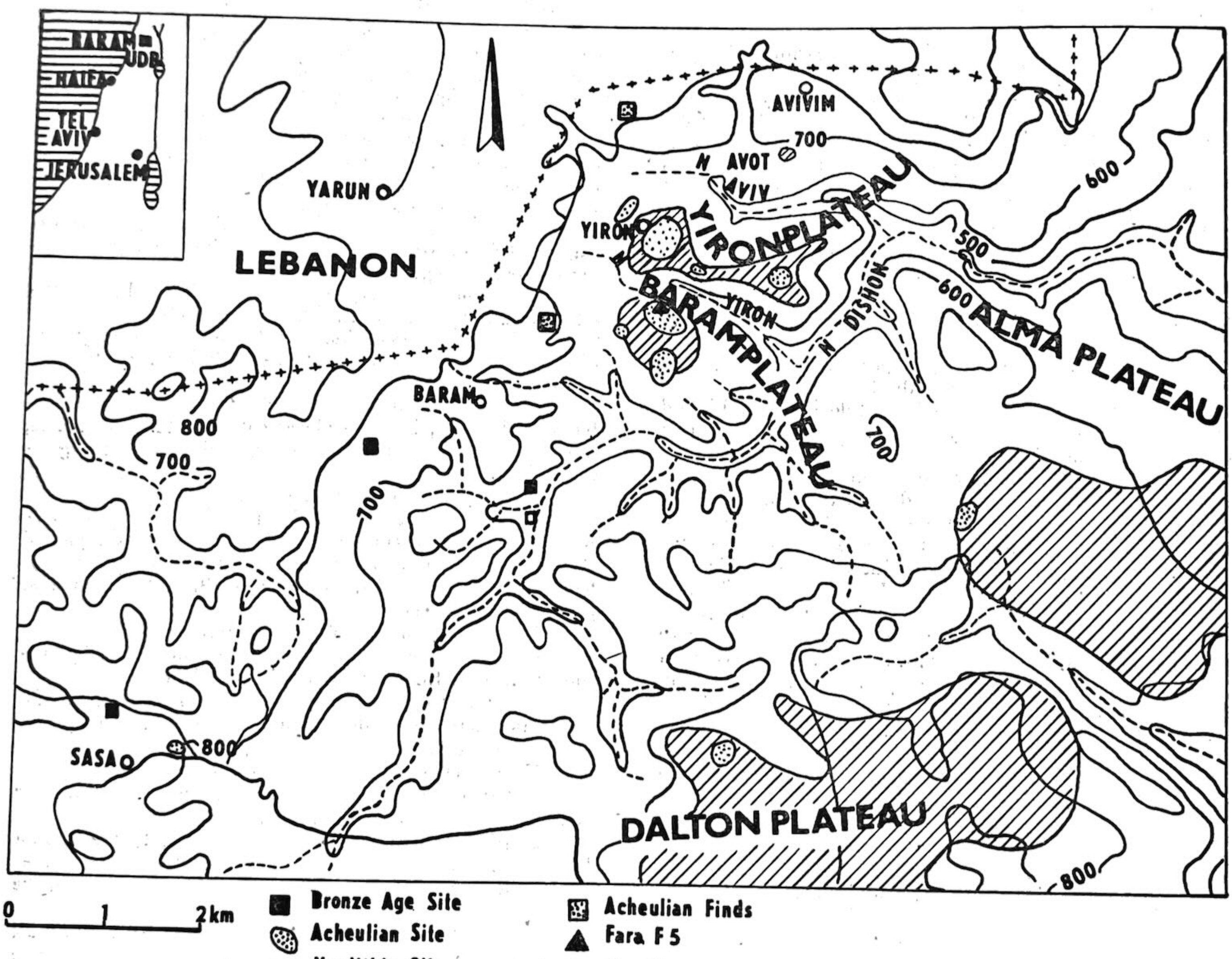

FIG. 1. *Upper Dishon Basin (modified after Ronen A.et al. [1974] 'Notes on the Pleistocene Geology and Prehistory of the Central Dishon Valley, Upper Galilee, Israel',* Quartär 25, *Fig. 1). All find and site markings represent locations prior to our first season (1979). UDB in inset means Upper Dishon Basin.*

been much interested in examinig thoroughly, as far as such a survey as ours enables, any promising site discovered; this is why we have made up our mind to prefer thoroughness to rapidity (see Ohel and Bruder 1980).

IMPLEMENTATION IN THE FIELD

We will not discuss here the implementation of those aspects of the designed procedure that proved to have worked satisfactorily in the field. It seems to us far more interesting to raise those points that had to be modified or changed in order to find some compromise between our plan and the compelling requirements or constraints of reality.

Giving up Find-spots

Quite soon (in fact, already while surveying the first section) it became apparent that recording every isolated find-spot even on an enlarged map meant overdoing to a large extent. In a region like ours where vast areas are sterwn by numerous individual artifacts, the meager information to be gained from each find-spot does not justify the time invested in recording. Consequently we have dropped the find-spot category from our scheme. Separate find-spots were thereafter to be included within scatters. For compensation we made sure that such find-spots, when they occur, would be mentioned within the general description of a scatter. (Thus a scatter might sometimes consist mostly of many isolated finds-spots.)

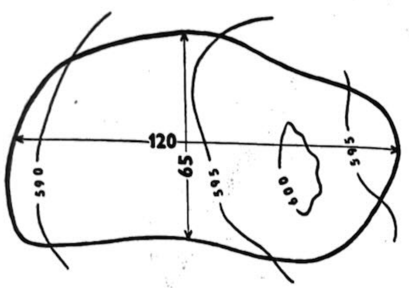

FIG. 2. *Hypothetical site boundaries with contour lines, length and width (in m) entered.*

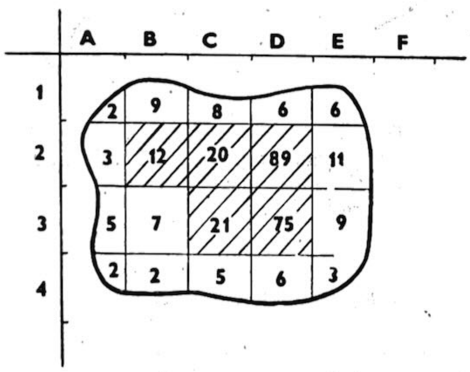

FIG. 3. *Hypothetical site boundaries with density counts per m²; collected squares (25 %) dashed.*

The Problem of Site Boundaries

Corresponding to our plan, site boundaries had to be established by artifacts counts in 1×1 m squares beginning from the center of a cluster and spreading out; the marked diminution of density should have provided relatively trustworthy boundaries. We have already then suspected that such a procedure might too often prove too time consuming. Once in the field, we have decided nonetheless to give the desired technique an actual try.

Fortunately, our first site (Nahalit: see Ohel and Bruder 1980, *Fig. 3*), which was examined in a slightly different way than thought in advance, happened to have been a very small one (about 300 m²). We started with nine 5×5 m squares covering what we assumed was the center of the concentration (squares B—D/2—4 in *Fig. 4*). The results drew us down south for another three 5×5 m squares (B—D/5) which showed a density as high as the three above them, or even a little higher. (Admittedly these densities are altogether of relatively low values.) However, compared to the overall artifact occurrence in this section (A for Avivim: see Ohel and Bruder 1980), Nahalit should most probably be considered a cluster. In our view this is a case in point to justify our reluctance of fixing "magic numbers" as mentioned earlier.) By then we had nearly spent the entire day at this site. We decided therefore to proceed by a band of 1×1 m squares all around. Luckily we had to extend our counts beyond the latter band in the southeastern corner alone, and not too far either (see *Fig. 4*). However, the whole operation lasted for about a day and a half. Furthermore, in accordance with our procedure, the artifacts from only 25 % of the squares had to be collected (see B—C/4, B5, and D5 in *Fig. 4*). Thus we had to empty quite a number of bags that had been filled solely for the purpose of counting, concomitantly disturbing the state in wich the artifacts had been positioned before.

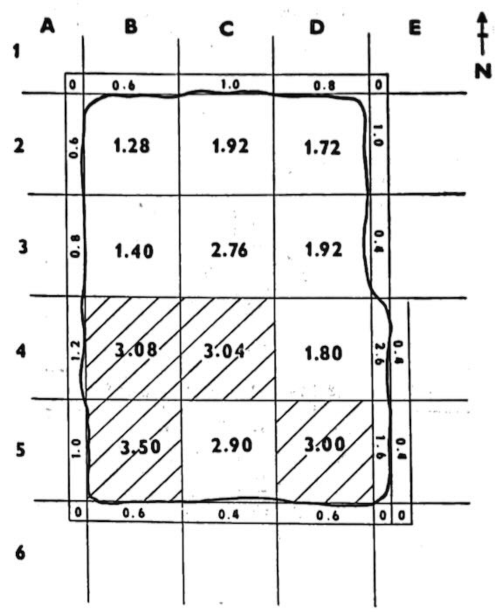

FIG. 4. *Artifacts per m² (based on 5×5 m and 1×1 m squares) at Nahalit site. Limits of site determined by sharp decrease in density of artifacts. Sample collected from dashed squares (about 25 % of total squares).*

If short, it became perfectly clear that treatment like this one could not be afforded any longer. Again, one ought to remenber that Nahalit was a small cluster. Were we to invest proportionally the same time and effort in much larger and richer sites to come, our survey would be in danger of self-blockage too soon (cf. Flannery 1976, p. 58). We finally abandoned point C(6) and the first half of point C(7) of our procedure replacing them by the subjective, less dependable technique, namely, visual examination, often aided by what we called "test crosses". (This technique is essentially based on the "windmill slates" technique practiced in a former study of ours (Ohel 1977). Although this is admittedly a drawback from adequate random sampling, in certain pressing exceptions it may be, partly at least, understandable (see, e.g., Hester et al. 1975).

The Test-Cross Technique

A test cross is simply two strips at right angles to each other, and divided into 1×1 m squares for the purpose of comparing the quantity of artifacts in them. To be sure, the test-cross technique saved time. Moreover, under the compelling circumstances it has also proved to bear some further advantages, as follows.

1. After boundaries of a site were outlined, limited test crosses could be quickly layed out at places where drawing the boundary line appeared to have been somewhat more problematic than at others. As a result the line could be corrected at once.

2. Whenever doubts arose whether we have encountered a cluster, or whether what seemed a cluster to us was nothing more than just another part of the scatter, test crosses helped decide one way or another on the spot. Thus quite a number of seemingly clusters to the eye were shown not to contain after all much higher artifact density per m^2 than the dispersed material nearby. (Rather soon we have learned a rule of thumb, namely, that what is seen from above usually exaggerates the real number of artifacts on the ground. It is merely when collection starts that all natural pieces can indeed be detected, and excluded.)

3. Test crosses could be utilized rather efficiently for approximating boundaries of comparatively small concentrations *within* a site as well as for aquiring quite a confident appreciation of their densities (for one such example, see *Fig. 5*). At the largest Acheulean site we have discovered, Mitzpeh Yiron on the Yiron Plateau (see Ohel and Bruder 1980, *Fig. 6*), we were able to test not less than 14 different intrasite concentrations, and collect samples from them in a short time by comparison.

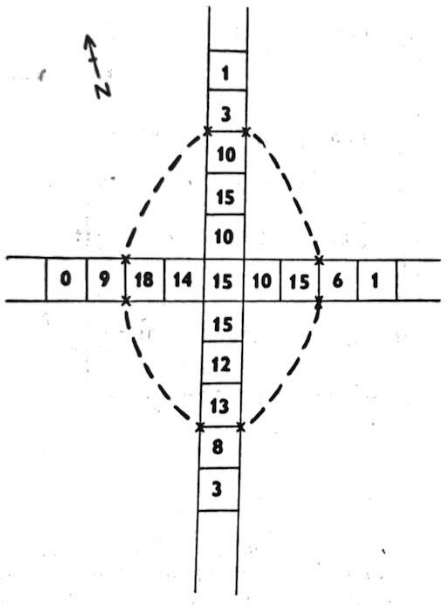

FIG. 5. *Test cross across a small concentration at Mitzpeh Yiron site (Y25/B1) with densities per m^2 and approximate boundary (the symmetrical outline in this case is merely an accident).*

There is no denying the fact that decision about both the placement of a test cross and the delineation of boundaries was heavily influenced by subjective judgment. The test-cross procedure cannot be equaled of course to one whereby complete sites are absolutely covered by a grid and counts are performed throughout, or in a considerable number of squares randomly chosen. Such a desired procedure has proved impractical under our conditions, so we had no choice but to compromise (see Pinder et al. 1979, p. 435). Subsequently, the use of probability manipulations is bound to be highly limited; the test-cross technique must be viewed in the light it was intended for: approximating densities and boundaries of selective concentrations in the initial survey stage (see also Redman 1974, p. 5).

Sampling of Complete Sites

It became coincidentally inevitable to dedicate much greater attention to the careful implementation of the second half of point C(7) in our designed procedure. And indeed we have random sampled all our sites but the last one (altogether eight sites (some of them quite large ones), the last one, Ein Yiron (see Ohel and Bruder 1980, *Fig. 6*), being a huge Chalcolithic site measuring about 27,000 m^2; we had no sufficient time left to random sample such an enormus site, and we hope to accomplish it in the future), mostly adopting a somewhat modified version of the transect strategy (see Redman 1974. pp. 16–17) which we christened by the name "the Big X" *(Fig. 6)*. The Big X presented in Figuhe 6 (of Hatapuah, or the Apple site: see Ohel and Bruder 1980, *Fig. 6*) comprised a total of 140 1×1 m squares, 36 of which (25 %) were drawn from a table of random numbers for collection. (Plus 35 one which we have always added to supplement in the event the intersection square happens to be drawn for both arms. For a similar technique of crossed transects, see, e.g., Bar-Yosef and Goren 1980.)

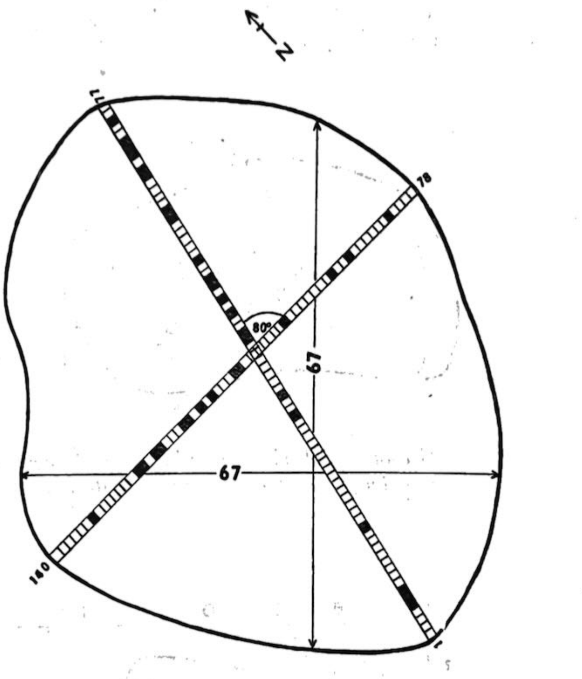

FIG. 6. *The Big X over Hatapuah site (Y27). Each little square represents 1 m^2. The blackened are the 36 squares randomly drawn for artifact collection.*

Since we have regularly drawn samples of no less than 25 % and sometimes even more, we assume that we have not merely obtained a fair representation of the distribution and composition of the lithic assemblages but also an idea about the divergent densities in the various parts of a site (and see Redman 1974, pp 16–17). Thus we hope we have somewhat compensated for the loss in credibility by applying more subjective approaches.

SOME TIME-SAVING SUGGESTIONS

It seems needless to stress the importance of keeping every single piece of equipment in place and in order during a survey. While good order is always good, it is a hundredfold more so when the team is regularly on the move. If time is a precious commodity for surveyors in particular, then wasting it ceaselessly in recurring searchings for one item or another because of disorder and negligence, equals almost to comitting a crime — especially in these days of extremely scarce financial supports. In what ways should the person in charge acquire from his team this crucial order and efficiency is perhaps more than anything else a matter of that person's views and temperaments. But, if he fails to aquire those inevitabilities, let him at least not wonder how time passed by before he had achieved anything.

Briefly, the following are several suggestions concerning little arrangements that served us tremendously in the field in saving time:

1. Insist on putting every thing in its proper place, as prefixed, so that it can be found there in no time when needed again.

2. You can use natural stones when they exist abundantly around instead of pegs or nails for marking the corners of your squares.

3. Have prepared in sufficient number marking strings of 5 m and 1 m long (some of 10 m long will not cause any harm as well) with nails fastened to them at every meter.

4. Use long meter rollers for marking the Big X's arms (or any other similar lines). You will usually not need to mark the opposite line of a strip provided your people are sufficiently equiped with meters (metal, wood, or primitively prepared strings).

5. As soon as you know the total of squares, asign two members of the crew (or yourself and one in addition) to draw the numbers from the random table. At the same time the rest can prepare bags, lables, etc. In case the work day is at its end but you can still manage to get the total of squares, you may save incremental time by drawing the random numbers in the evening for the next morning.

6. As soon as you get the random numbers, asign one person to mark the chosen squares, and a second person to complete the labels with the square numbers, place the lables in bags, and place the bags in the corresponding squares; it is safest and quickest for just one person to put all bags in their proper squares in advance. The remainder can start collecting straightaway.

7. Instruct your crew to leave the full bags in the squares so that two persons passing along each arm can collect them rapidly at the end.

CONCLUSIONS

We had two composite objectives in writing this paper: first, to outline our procedure for the Upper Dishon Basin intensive survey; second, to describe several problems in the implementation of the procedure in the field. We have tried to dwell more on the latter than on the former because many archaeologists do not commonly tend to bring up these kinds of difficulties, or to explain the compromise they actually make quite often. We contend that the illustration of these very obstacles and of some suggestions that may partially help in overcoming them is not less teaching — perhaps even more so — than that of the nicely outlined design, and the end results.

This is not meant by any means to weaken the urge for procedure planning oriented to meet the particular objectives of a specific research. On the contrary; and we made our utmost to stress the cruciality of this appoach. However, lacking any degree of flexibility in implementation in face of inevasible realities (For a similar emphasis, although directed to somewhat different premises, see Bar-Yosef and Goren 1980), may result in worse outcomes than any sensible compromise. Quite often decisions are to be made in the field and unforseen alterations introduced without delay. The archaeologist is then expected to recruit the best of his judgment aimed at attaining the best of possible results.

FOOTNOTE

Thanks are due to our former students: Bradely Featherstone, Kevin Pape, and Sharon Warner from the University of Cincinnati who came over from the U.S. to join the survey; to kibbutz Baram, and to some of its members who occasionally came out to help; to the Field School of Har Miron for accommodation; to "Plastofil" of kibbutz Hazorea for the donation of plastic bags; and finally to our colleagues O. Bar-Yosef, N. Goren, M. Lamdan, A. Ronen, and M. Weistein for their useful remarks to the manuscript; the responsibility for all shortcomings is of course our own. This project is supported by a grant from the National Geographic Society and the Wenner-Gren Foundation to which I owe gratitude.

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