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FIELD RECORDING TECHNIQUES FOR EXCAVATING NEOLITHIC SITES

1. Recording of excavations at one site

1.1 *Introduction*

The advanced field excavation techniques suppose the direct use of computers in terrain. These, however, have not yet been common, and instead many different recording systems were developed using prescribed forms. Such forms usually serve as an input data source for more sophisticated data files. The documentation systems differ according to particular archaeological schools and are often unified only on the level of one excavated site.

The automatisation of field excavation techniques results in the more intelligible and practical labor division between technical staff and a problem oriented direction of archaeologists who are heading the excavations. It can contribute to the profound intensification of excavations, increased efficiency, and higher quality. This is especially welcomed in the increasing ratio of salvage activities.

1.2 *Recording the X and Y coordinates*

The field situation of the "open" Neolithic sites is more simple in comparison with the complicated stratigraphy of tells, or caves. The submerged features are usually covered by a shallow layer of soil and they are usually discreetly separated. The recording of finds in spatial coordinates is a self-evident claim. We are using the system of geographical coordinates which are zoomed into a detail grid of 15x15 meter squares called sectors.

The system of sectors is imposed over each excavated site section which is composed of areas continuously covered by archaeological finds (Fig. 1). The sector squares can be subdived into smaller 1x1 meter squares and/or to record X and Y coordinates of individual finds with more detailed accuracy. The system of coordinates covers the whole section and could therefore be used at different times of excavation. This is the difference between the Aldenhoven-system, where the coordinates are locally posed only over a separate features.

The base map of the excavated site is contructed within this system of coordinates which enables prompt orientation in the field during different phases of excavation, when the features need to be uncovered first, delimited and labeled subsequently. It is necessary to use the unified system from the beginning when several people are working together in order to coordinate their activities. Finally the 1 m square grid is used for excavating large com-

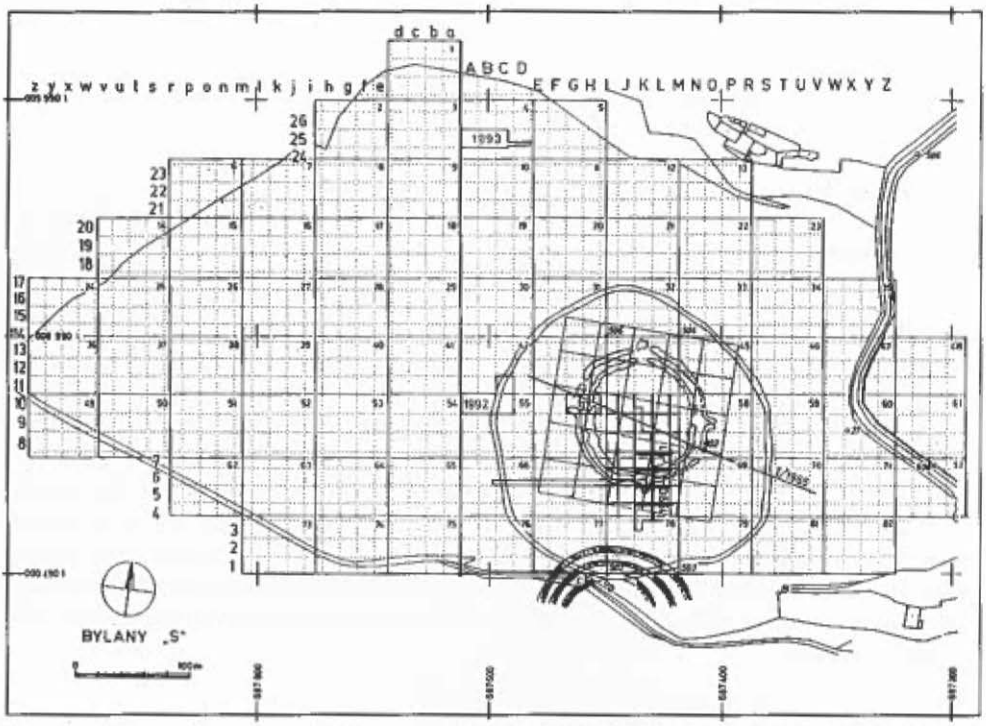


Fig. 1 – Bylany (Czech republic), excavations of the Neolithic site. Recording x and y coordinates within geographical grid. The 15x15 m grid for the section S together with the Neolithic enclosures system resulted from geophysical prospection.

plexes of pits whose composition is unable to be recognized from the initial reconnaisance. The unified system of cross sections respecting this grid is sufficient in most cases.

1.3 *Excavating Z dimension*

The fill of the features is excavated within the third Z coordinate which is usually scaled in 10 cm spits starting from a reference point randomly selected on the excavated area. This zero point can be, if necessary, labeled at an exact point above sea level. At the first phase of excavation the part of the feature is uncovered following levelled "mechanical spits" in accordance with the reference point. For computer purposes the codification differs for "mechanical spits" with the "natural layers" of the second phase. Within the complex situations of medieval age sites or town centers, the system of Harris' matrices is used, when the individual "contexts" are labeled and levelled during the whole process of excavating. The field situation as well as the finds content can be interpreted within different complexes.

Our system differs in the second phase that follows after the interpre-

tation of fill uncovered by the first phase of excavation. At the second phase of excavation the rest of feature is excavated in "natural layers", interpreted according to their different colors and structure. The plane edges are followed and they are recorded according to their sequence. According to our experiences following the plane limits of layers in the field is more difficult than recognizing them on the section. For the separated smaller features, the first phase covers about one half of it. For the large pit complexes, the first phase is realized within the 1 m square grid by the chessboard-like system. The comparison of find distribution within spits and layers is then possible which enables the reconstruction of formative processes as well as the interpretation of the feature content.

1.4 *Recording form*

We can recognize three types of recording systems used in the case of Neolithic sites excavations. The first of them I call analytical and it consists of separated lists used for each type of field work. It was developed for "Bylany" site excavations (Bohemia) during the years 1953-1967. A general list was necessary to coordinate particular records. The advantage of this system was the possibility to facilitate the separated technical steps and to coordinate the activity of several people.

The second one can be called the compact system and it was developed for the project «Aldenhovener Platte» excavations in Germany (Farruggia, Kuper, Lüning, Stehli 1973). It comprises one form of collecting all records on activities made in terrain according to particular features. The evidence of items, the drawn documentation, and the description are all put together. It enables very operative documentation fitting to the situation of salvage excavations.

For the purpose of excavation of the Neolithic enclosure (Pavlů, Rulf, Zápotocká 1995), we tried to use the advantages of both preceding systems of recording field data. The combined system composes the terrain form with the individual lists of activities. On the first page, the general description of one feature is concentrated including the situation of the feature, it is labelling, phases of excavation, documentation, and the following processing of finds or fill samples. The draft of the feature is possible to draw on the second page, where the template of find fractions is available. The schema of recording the X, Y, and Z coordinates is presented on the third page. The rest of the form consists of the different lists of activities concerning of feature documentation or finds.

Attention was paid to the separation of different fractions of finds. The fractions were defined according to a scale used in geology. The recording system enabled operational manipulation with the finds of different fractions in differently reconstructed contexts. The distribution of finds in rela-

tion to mechanical levels were compared with their distribution within the reconstructed natural layers. This facilitated the separation of asynchronic features, the consideration of formative processes, and the chronological interpretation of the main enclosure.

1.5 *Excavation case. Bylany 1991: pit complex 1770*

A. Uncovering

After uncovering the ploughing soil, the dark fill of the Neolithic features at Bylany was visible in the light yellow, loess-subsoil. The case at section S was different because of an erosion upper layer partially covering some features in the vicinity of the late Neolithic enclosure. This layer corresponds with the upper part of the ditch fill and might have been caused by soil degradation process changing the destruction of the soil wall-body next to the ditches.

The suggested method of a sequentional level excavation helped to solve this unpleasant situation. The edges of particular features were more visible in the lower horizonal levels of the uncovered area. The situation occured at the large pit-complex # 1770. An internal subdivision of the complex in planum was not possible because no color differences on the surface were recognized.

B. First phase of excavations

During the first phase of excavation, a set of squares were excavated following 10 cm thick levels in each of them. Approximately 50 cm above the reference point, the situation was the most agreable and two parts of the complex were separated. The complete system of regular cross-sections was documented with different layers. In most of them, it was possible to recognize a dark lower fill containing larger artifacts. The lighter, middle fill contained a mixture of smaller, secondary refuse. Finally the upper fill was partly contaminated with material from the last period of settlement.

C. Interpretation and second phase of excavation

The different layers in particular pits were identified after the first phase of excavation. The regular round pits were visible in the northern part of the complex. Along the western edge of the feature, a shallow trench was followed that can be interpreted as a part of a house construction from the earliest period of Linear Pottery Culture. The southern part of the complex was not clearly interpretable after this phase of excavation.

We started the next season with the second phase of excavation, uncovering the layers that were visible on the sections. At the southeastern edge of the complex, a shallow pit was separated. In the central part of the complex, at least two different features crossed each other as recorded on the sections. The artifacts were processed into the first phase sequence of levels

and compared with the sections. It appeared the material was concentrated at the transition between layers on the top of earlier or at the bottom of the following ones. This is the result of several interruptions of the filling process.

D. RECONSTRUCTION OF THE COMPLEX EVOLUTION

After finishing both phases of excavation and after processing the ceramics from different levels and layers of the complex it was possible to reconstruct the sequence of the digging and the filling activities occured in the particular pits. At the beginning of activity in this spot, the wall trench and construction pits of a house were dug out (context D). The central parts of the construction pits dissappeared with the next actions. During following period, the silo B and possibly pit F were dug out. They were followed by pits B , G, and silo E. Over the final filling of this complex, the irregular erosion layer (context A) from the time of Stroked Pottery Culture was deposited. It is characterized by coarse grain and stony soil.

1.6 *Digitizing of the excavation map*

As a final step of documenting the X, Y, Z dimensions of the excavation their digitalization can be considered. This could also be done immediately during the field work, but presently it is not often realized. Digitization is used more for large scale mapping than for detailed documentation of features. The original map, which was made by other techniques can easily be digitized, and used for analytical purposes. As an example, the plan of Bylany excavations in 1966-67 could be presented here.

From the overall digitized map divided into several subfiles of data, many different variants can be developed. The pits and houses were digitized separately as well as the grid, boundaries and recent destructions. Each of them have a description added. Consequently, the map of individual settlement phases can be used as an example. The archaeological content of features can be further analysed graphicaly. An example shows the general trends in the relative appearance of coarse ware in house complexes among first four settlement phases, and between the first two of them (Fig. 2). In the future some of the GIS methods are proposed for an analysing the intra-site relations.

2. PROPOSAL OF THE RELATIONAL DATABASE FOR A DOCUMENTATION OF NEOLITHIC SITES

2.1 *The set of database tables*

The proposal of a relational database represents the next step in recording the Neolithic site excavations. It is based on the up-to-date data from these field procedures. The aim of any recording system is to save the data on

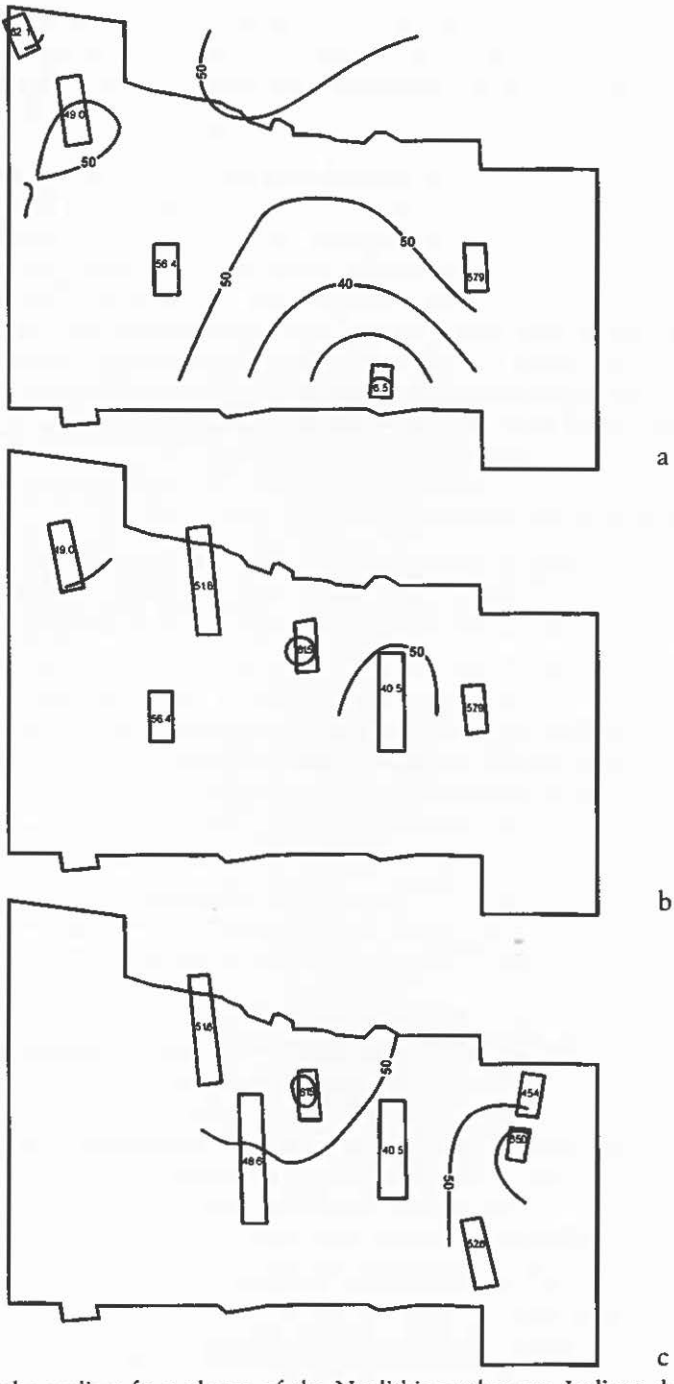


Fig. 2 – Bylany, the earliest four phases of the Neolithic settlement. Isolines showing the tendencies of the coarse ware distribution between the houses dated into phases 1 and 2 (a), 2 and 3 (b), 3 and 4 (c).

an excavated object for the purpose of further processing or publication. The original data can be distinguished from the additional data. The former must be recorded during excavations and it is uncorrectable after finishing the field activity. The latter can be added to a database later for some of it needs at least preliminary proccessing of excavated finds. Most of them belong to interpretive attributes that depend on more or less subjective classification of features. The database records cannot be filled in immediately during the excavations.

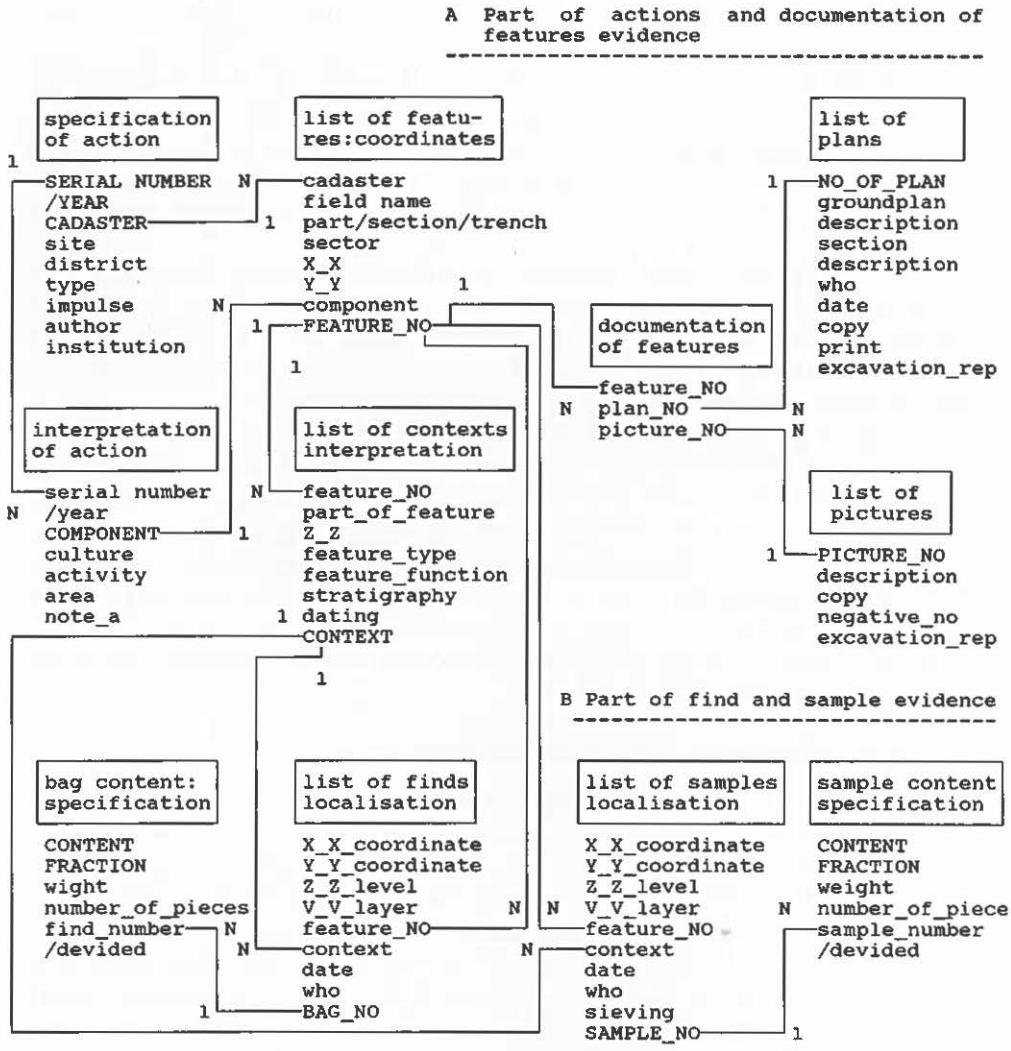
The proposal tries to separate the fields of different categories into different tables. As a consequence it seems reasonable to divide our former lists and separate the specifications from intepretations as well as from their spacial coordinates. In the case of plans and pictures the table of labels is used to cover possible N to M relations (Fig. 3).

For integrating single excavations into any higher information system it must be included in the list of actions. The list itself is proposed in two parts. The first specificates the circumstances of a excavated site (site, district, type of site, impulse of excavations, its author and his/her institution). As the key attribute cadaster is used for one numbered action a year. The second part contains intepretative features of an action like area and activity of a specified culture or cultures excavated on a recorded locality. The contemporary features of the same function comprise a component that is the key attribute of this table.

2.2 *The documentation of features and the list of finds*

The former list of features as the basic excavated entities on a Neolithic site, we called also "concordance" because of its concentration of the main evidence, is proposed to be divided into spacial evidence and their subdivision into contexts. For spacial evidence, the X-X and Y-Y coordinates are used to specify according to each cadaster, its part, and used grid of squares. To the context attributes the horizontal as well as vertical subdivision of a feature is added, beside its type, function, dating and or stratigraphy. Each feature is principally documented by pictures and by drawn plans of its groundplan and section. On one plan or picture two or more features could be recorded. Therefore their labelling is doubled in a separate table. In the tables of plans and pictures, the data about authors, next procedures, and final excavation report are included.

The second part of the proposed database consists of two lists. The first list is made of finds collected in the field into bags or other containers. Sometimes the different types of finds are separated immediately. Therefore the specification of content as well as of its size is included in one table, and the specification of the finding context into another one. A bag contains theoretically the whole matrix of different find-types of different sizes. The



Codification:
1. Specification and interpretation of actions see system ARCHIV (ARÚ Praha).
2. Interpretation of features and contexts see BYLANY I.
3. Bag or sample content: pottery, daub, silex industry, axes/adzes, millstones upper/lower/?, handstones, grinding stones, other stones, bones charcoals, others.
4. Fractions: A>20cm, 20cm>B>6cm, 6cm>C>2cm, 2cm>D>0,6cm, 0,6cm>E>0,2cm.

Fig. 3 – Proposal of the relational database for a documentation of Neolithic sites.

distinguishing of find-size enables a study of formative processes. The list of samples is organized accordingly. A kind of find and its size can be in this case described only after processing the material, usually after sieving. The result of it can be negative, or if positive it is comparable to the other finds. Usually within bags the fractions D and greater are evidenced, and within samples the lower fractions are specified.

3. Introducing the recorded data into the information system within one institute

3.1 *Database system «Archiv»*

The set of lists is completed with the list of actions, which enables one to collect the documentation of different sites. The latter is compatible with the system «Archiv» used for the centralized recording of archaeological activities within the Prague Archaeological Institute (Kuna 1992). The system is oriented for storage, retrieval and classification of information on archaeological localities. It is supposed that an "action" is the basic unit of an archaeological field activity, bringing an enclosed set of archaeological data. This data unit is geographicaly, chronologicaly and functionly specified and separated from each other. The system is filled in with data through incoming information on "actions" unified in an specific form prescribed for every field activity of the Institute. The data on the former activities are systematically complemented and revisited. Presently, it includes all the actions since 1984 and it is continually updated.

3.2 *System enlargements*

It is proposed to unify in the future this basic information system with other systems such as bibligraphy, museum catalogues, evidence of monuments, construction activities, surface prospections, aerial photos, and Geographical Information System (Kuna 1994). All these databases together will make an information complex of archaeological data. Its special part is the complex of specific data for artefacts excavated on Neolithic sites (Pavlů, Štuler, Soudsky 1987). The other culture depended data could be added to it. It is supposed that it will serve on a national, as well as on an international scale of computer mediums.

Ivan Pavlů
Archaeological Institute, Prague

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ABSTRACT

The field excavation techniques of Neolithic sites have changed during the past two decades. With these changes, data recording procedures have also changed profoundly. The method of merging excavated horizontal levels and reconstructed layers is presented. The respective database structures were developed. The advanced finds analyses were done and their results show the patterning of site refuse in large Neolithic pit-complexes. Finally a proposal of relational database was developed.