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Pottery making processes at Esh Shaheinab, Sudan

The site and the sample

Esh Shaheinab is located on the west bank of the river Nile about 50 km north of Omdurman (Fig. 1). It was one of the first sites excavated by Arkell (1953) in the Sudan and is mainly known for its Neolithic occupation, although Arkell's excavation brought to light remnants of a previous Early Khartoum occupation and later, Late Neolithic and Meroitic graves (Arkell 1953). The ceramic assemblage from Arkell's excavation is presently stored in the National Museum in Khartoum and was recently restudied by the present author (Garcea in press b). The majority of the examined sherds belongs to the Neolithic (764 pieces), some are from the Early Khartoum period (177 pieces) and a few from the Late Neolithic (28 pieces; Fig. 2).

Theoretical and methodological starting point

Artefactual materials were the first discriminating elements to distinguish between what Arkell (1949) initially called 'Wavy Line Culture' and 'Gouge Culture,' respectively, taking a ceramic decoration and a lithic implement as defining cultural markers. He soon changed those names into 'Khartoum Mesolithic' and 'Khartoum Neolithic' in order to specify the economic organisation and the relative chronology of the two cultures (Arkell 1953). Nevertheless, he continued to use stylistic and typological criteria to make temporal and cultural interpretations. He correctly identified the Dotted Wavy Line pattern as a "typological link between the pottery of the Khartoum Mesolithic and the pottery of the Khartoum Neolithic" (Arkell 1953: 69). His excavations at El Qoz, as well as at Esh Shaheinab, provided stratigraphic sequences that confirmed such interpretations.

Far from accepting guide fossils as cultural markers, I would like to emphasise that material productions result from a symbolic system of cultural

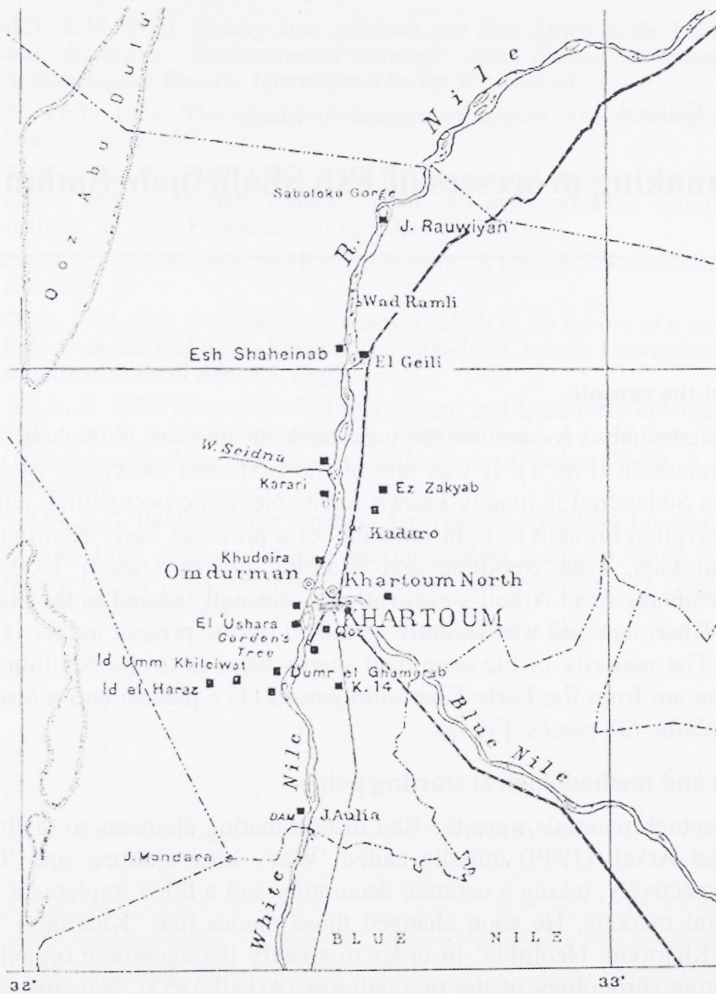


Fig. 1. Map showing Esh Shaheinab and other 'Khartoum Neolithic' sites located by Arkell (1953).

meanings. They are the products of a social network that identifies its culture in a precisely determined technological behaviour (Lemonnier 1993; Gosselain 2000; Livingstone Smith 2000). For these reasons, all stages of manufacturing processes are equally relevant and meaningful to define material identities, as artisans

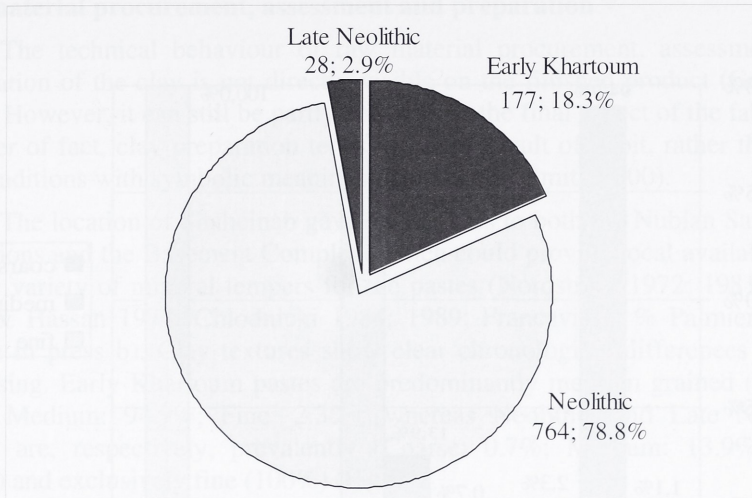


Fig. 2. Numbers and percentages of potsherds.

continuously make “technological choices” (sensu Lemonnier 1993) during their operational sequences. Choices can be unconscious and unintentional (Lemonnier 1993), as well as deliberate and competent (Pelegrin 1990).

Decoration is but one of the stages in the process of the chaîne opératoire of pottery manufacturing. The entire process starts with raw material procurement, assessment and preparation of the clay, it continues with production and finishing, and ends with use and discard of the pots (Garcea 2005). In order to consider all these parameters, I entered the data in a relational database on Access© platform. They were organized in a nested hierarchy through a system of linked user forms. Crossed field queries were used to elaborate the data.

Spatial distributions of pottery making traditions, of their use and discard have complemented the analysis of manufacturing processes as they allow to locate social identities and behaviours, or rather “sociotechnical aggregates” (Gosselain 2000). Statistical and geostatistical analyses have proved to be useful tools with regard to intra-site pottery distribution (Fontana 1998; Garcea in press a; Garcea & Caputo 2004).

As the decorative techniques and motifs of the ceramic assemblages from Esh Shaheinab have been presented elsewhere (Garcea in press b), this paper aims at pointing out some considerations on the meaning of the various stages in the manufacturing chaînes opératoires of the Esh Shaheinab pottery from the Early Khartoum, Neolithic, and Late Neolithic periods.

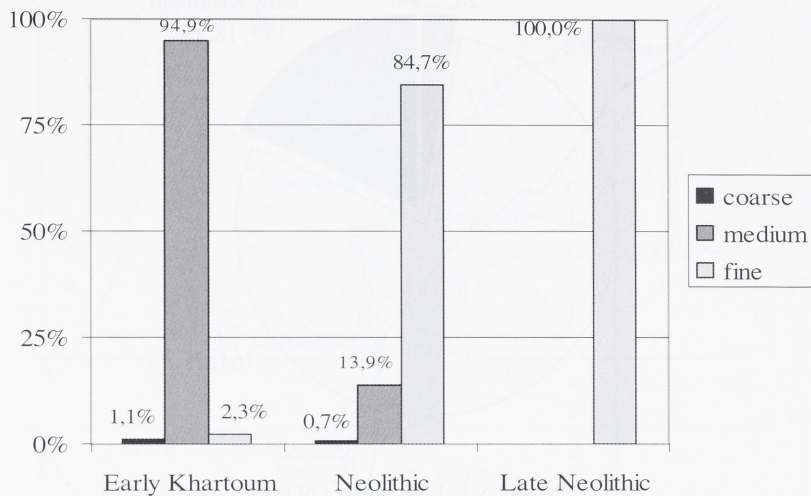


Fig. 3. Clay textures of ceramic pastes.

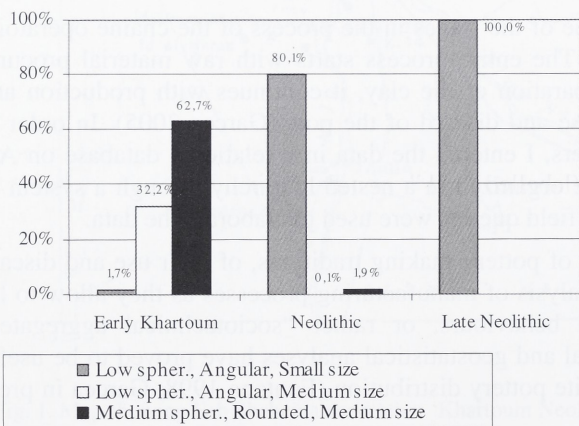


Fig. 4. Sphericity, angularity, and size of inclusions.

Raw material procurement, assessment and preparation

The technical behaviour of raw material procurement, assessment and preparation of the clay is not directly visible on the finished product (Gosselain 2000). However, it can still be partly detected on the final aspect of the fabric. As a matter of fact, clay preparation tends to be the result of habit, rather than cultural traditions with symbolic meanings (Livingstone Smith 2000).

The location of Shaheinab gave easy access to both the Nubian Sandstone formations and the Basement Complex, which could provide local availability of a large variety of mineral tempers for the pastes (Nordström 1972; 1981; 2004; Hays & Hassan 1974; Chlodnicki 1984; 1989; Francaviglia & Palmieri 1988; Garcea in press b). Clay textures show clear chronological differences in clay processing. Early Khartoum pastes are predominantly medium grained (Coarse: 1.1%; Medium: 94.9%; Fine: 2.3%), whereas Neolithic and Late Neolithic fabrics are, respectively, prevalently (Coarse: 0.7%; Medium: 13.9%; Fine: 84.7%) and exclusively fine (100%) (Fig. 3).

With regards to the main features of the inclusions, the classification of their sphericity, angularity, and size was based on estimation charts specific for each characteristic (cf. Orton et al. 1993: 238-239). Most of the Early Khartoum inclusions have medium sphericity, high roundness and medium size (62.7%). This combination of features disappears in the Neolithic (1.9%) and Late Neolithic (0%), whereas low-spherical, angular and small-sized inclusions are preferred in the later periods (Fig. 4).

In addition to mineral inclusions, potters incorporated organic tempers in the clay. Flat shapes usually come from undecomposed vegetal fibres, whereas tubular shapes derive from dung (Livingstone Smith 2001). Apart from the quantity of sherds for which it was not possible to determine the presence or the type of organic inclusion (labelled "n.d.": non-determinable), flat vegetal fibres were frequently employed in the Early Khartoum (Flat fibres: 15.8%; Tubular fibres: 1.7%). Neolithic (Flat fibres: 2.0%; Tubular fibres: 38.1%) and Late Neolithic (Tubular fibres: 42.9%) ceramics often included tubular shapes, indicating the use of dung for tempering clay (Fig. 5).

Production and finishing

Production and finishing, which include decoration, are the most visible stages of pottery making. As they are technically malleable, they can be easily transmitted to other potters (Gosselain 2000). Therefore, on one hand, it is true that the different styles of decoration can convey information on the identity of the group that produced them and the time and place of production (cf., among others, Plog 1980; Hodder 1982; Rice 1987). On the other, hand the easiness

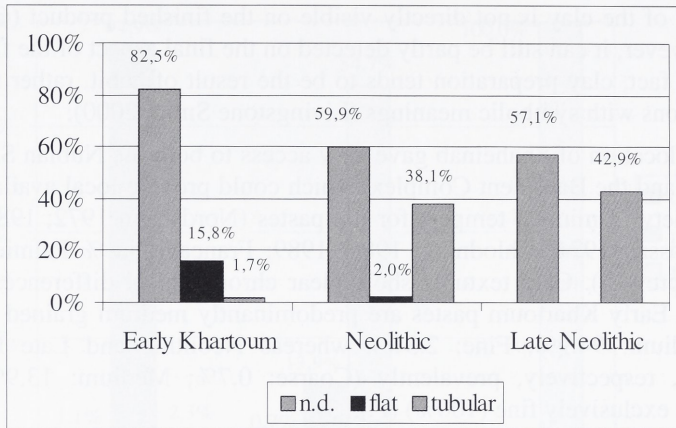


Fig. 5. Organic inclusions.

of transmission can favour their spread across cultural boundaries, depriving them of their cultural meanings as material products of a specific culture (Gosselain 2000).

The ceramic productions from the Upper Nile Valley offer clear examples of their diverse cultural meanings. Wavy Line ware represents the former case, which recognises the identity of a cultural group in a style of decoration, and the time and place of its production. In fact, this type of ware characterises the Upper Nile Valley in a defined cultural horizon and period of time, locally called Early Khartoum. Dotted Wavy Line ware typifies the latter case. It is spread from the Atlantic Sahara to the Red Sea and covers a span of time of several millennia (Garcea 1993; 1998). Such uniformity spoils any significant cultural connotation.

Use and discard

Intra-site distributions can provide information on the last stages of the operational sequence of ceramic productions: use and discard.

Geostatistic analyses can describe spatial patterns of abundance and were applied to the spatial distribution of the pottery from the three periods, Early Khartoum, Neolithic and Late Neolithic. The variations of pottery density were plotted on contour maps of the site. Mapping procedure applied kriging interpolation between sampled points to make estimates of objective isopleths. Kriging is the estimation procedure that uses known values and semivariograms to deter-

mine unknown values by plotting semivariances as a function of distance between sample points (cf. Flatman and Yfantis 1984; Garcea & Caputo 2004).

All potsherds were plotted on Arkell's original contour map (Arkell 1953: Plate 2). They were clustered according to their stratigraphic position into three groups of layers: Upper layer: 0/-30 cm; Middle layer: -30/-60 cm; and Lower layer: below 60 cm. The distribution and density patterns of these three groups were plotted.

As already noted (Garcea in press b), there are instances of undisturbed Early Khartoum layers below the Neolithic stratigraphy (e.g. squares I60/60+ and M83/70-100). The Early Khartoum pottery is mostly concentrated in one area of the site, but also appears in the eastern part of the excavated area (Fig. 6). The material was *in situ* and was present with respectable numbers of sherds throughout the entire stratigraphy of the excavated deposit. Kriging interpolation between sampled points shows the probable extension of the Early Khartoum occupation (Fig. 7).

The pattern of abundance in the three stratigraphic clusters of the Neolithic sample indicates that the site occupied a larger area in this period. The majority of the sherds were present in the upper and middle layers (Fig. 8). The contour maps of the pattern of density variation evidence a wide scatter in the upper layers and a concentration in two spots in the middle layers. Such variation may be due to post-depositional erosion of the archaeological deposit (Fig. 9).

Late Neolithic pottery was practically all located in the upper layer (Fig. 10). Contour maps suggest that it is more likely that the very few sherds in the middle layer penetrated from above, rather than being originally deposited there (Fig. 11).

Concluding remarks

To sum up, the systematic analysis of the Esh Shaheinab pottery, based on new analytical and statistical methods, provides information on the technological behaviour and cultural features of the three main pottery productions represented at the site.

Clay processing shows basic differences in the methods employed in the Early Khartoum in comparison to the Neolithic and the Late Neolithic. Preparation techniques, or possibly habits, underwent continuity in the Neolithic and Late Neolithic, although Neolithic pottery was probably locally made, whereas Late Neolithic ware was not.

The use of organic tempers can be related to subsistence patterns. Flat, undecomposed fibres were common in the Early Khartoum sample, whereas dung appeared with the adoption of herding in the Neolithic economic system.

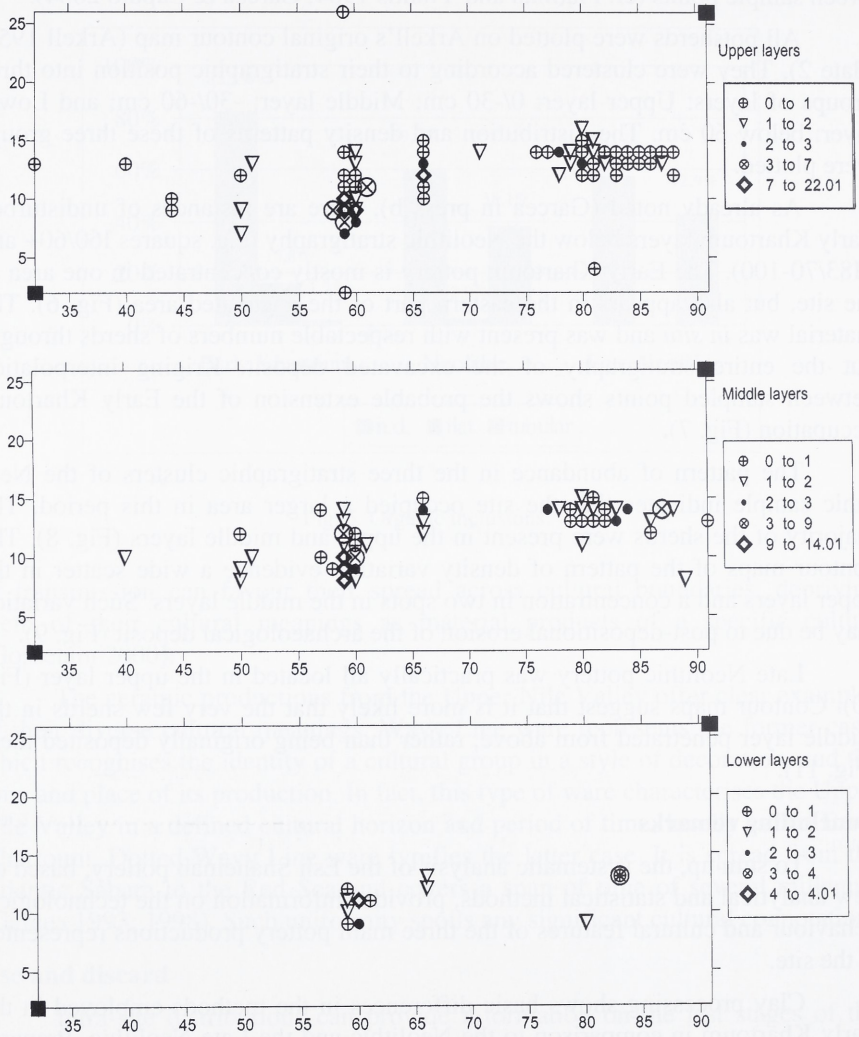


Fig. 6. Distribution and density patterns of the Early Khartoum pottery.

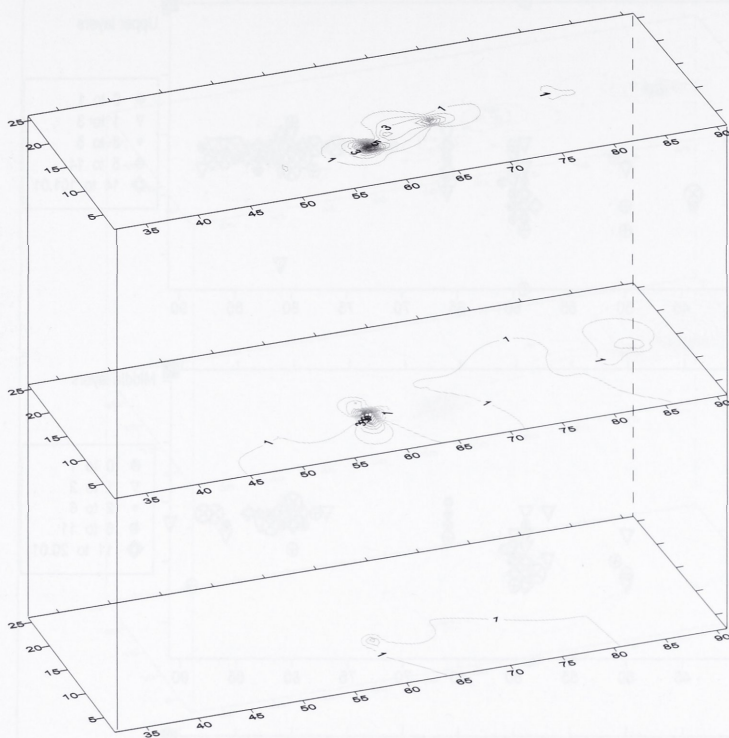


Fig. 7. Contour maps of the density patterns of the Early Khartoum pottery.

Furthermore, the frequency of dung suggests a continuous or repetitive use of the site in the Neolithic. Under these conditions, it could be accumulated and more easily exploited.

Intra-site distributions could provide information on the last stages of pottery manufacturing and post-depositional events. Geostatistical analysis showed that the Early Khartoum occupation was not as ephemeral as Arkell (1953: 3) believed. A stratigraphically documented deposit was still on the spot, in spite of the later uses of the site. The Neolithic occupation had the largest horizontal extension, although it was not very thick, confirming a repetitive settlement use. Finally, in the Late Neolithic, the site was only visited for funerary purposes by highly nomadic pastoralists.

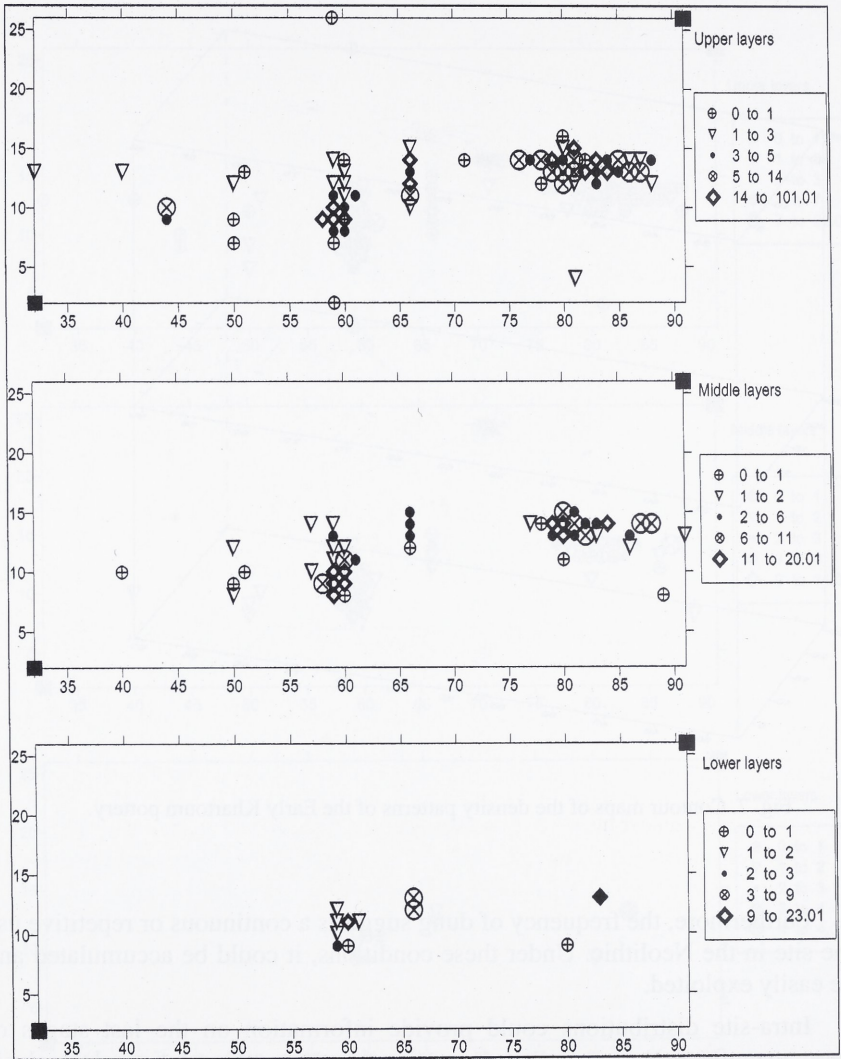


Fig. 8. Distribution and density patterns of the Neolithic pottery.

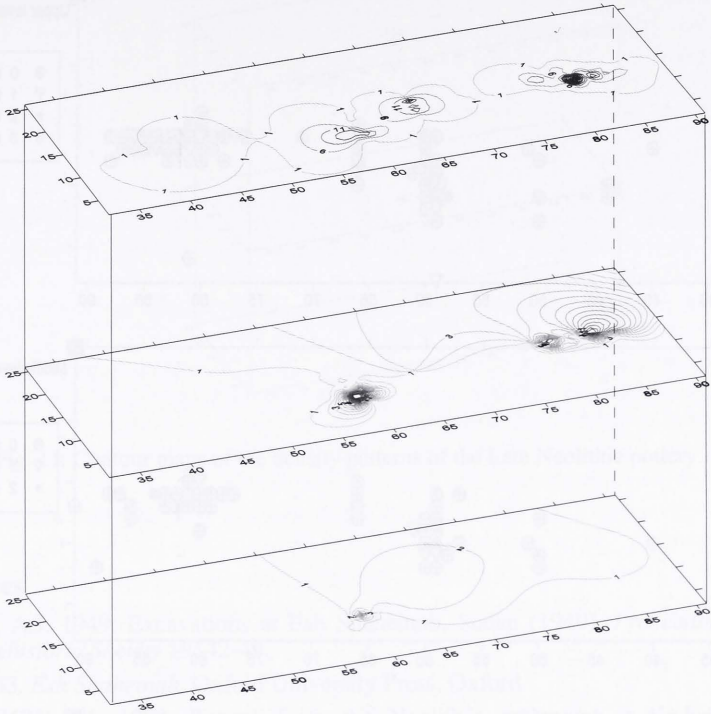


Fig. 9. Contour maps of the density patterns of the Neolithic pottery.

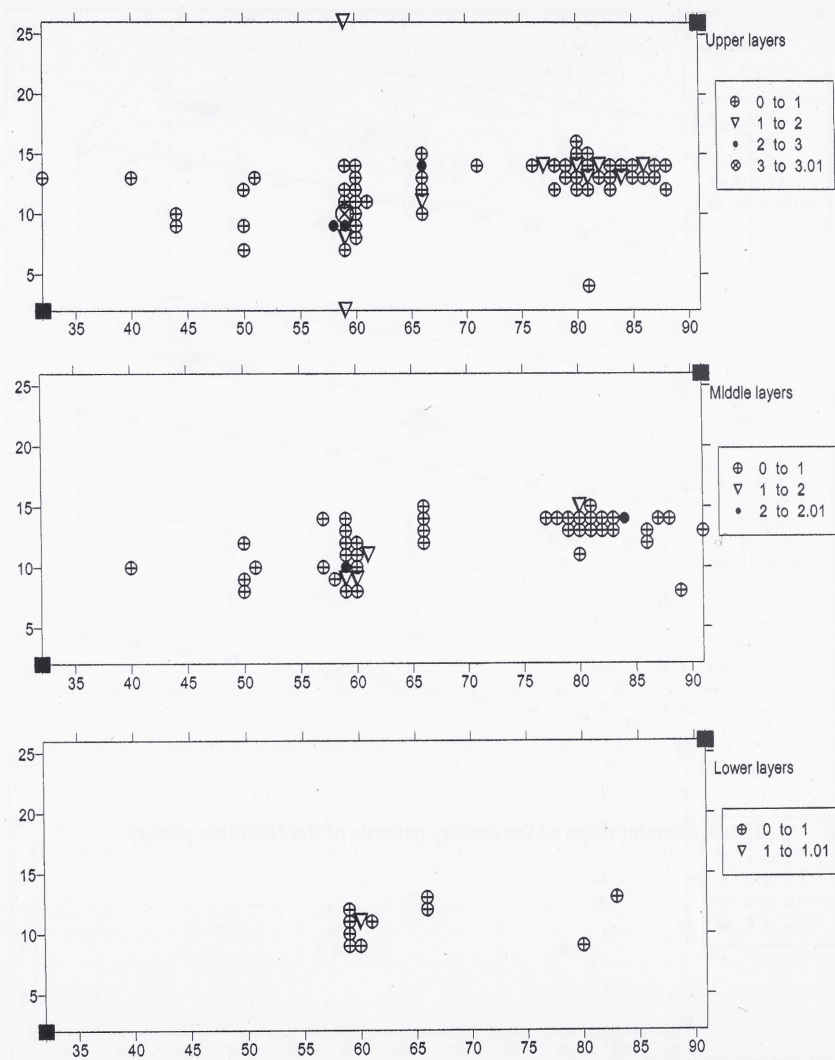


Fig. 10. Distribution and density patterns of the Late Neolithic pottery.

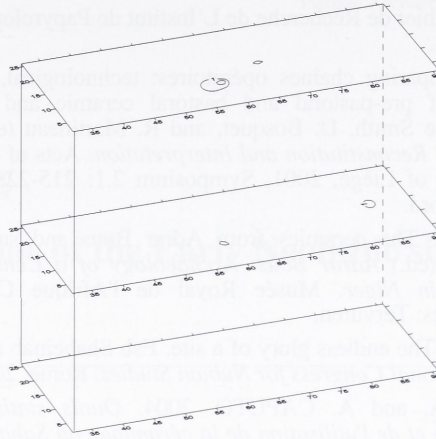


Fig. 11. Contour maps of the density patterns of the Late Neolithic pottery.

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