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Technical Traditions and Social Boundaries
The Case of Predynastic Egypt

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Abstract: This contribution illustrates the potential of the technological approach for the study of archaeological material (particularly ceramics) to highlight boundaries. Not only those related to the territory but also those associated to the organisation of human societies, which can often be invisible if not researched with specific methodologies. To this end, after a methodological introduction, the results obtained from the technological analysis of various predynastic ceramic assemblages from the Delta, the Nile Valley and, in particular, the First Nile Cataract will be illustrated, and the interaction and evolution over time of the different technical traditions identified will be explored. The paper concludes with a comparison of the situation at both ends of Egypt and highlights the various aspects and implications of technical boundaries and how they changed with the birth of the Egyptian state.

Keywords: pottery technology, social boundaries, Predynastic Egypt, borderscapes

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As highlighted by the Borderscape Project[1] for Egypt, and by recent scholarship on the subject, boundaries necessitate a multidisciplinary approach to be investigated, being a multifaceted and dynamic phenomenon.[2] 'Boundary' is in fact a general term that includes both 'borders' and 'frontiers'; 'boundaries' are thus 'unspecific divides or separators that indicate limits of various kinds'.[3] 'Borders' are relatively more linear, restrictive, and static, while

[1] PI Maria Carmela Gatto, POLS Call 2020/37/K/HS3/04097; see website *Borderscapeproject*.
[2] Brambilla 2015.
[3] Parker 2006: 79.

'frontiers' are more fluid, porous, and open. In this context, the 'borderlands' are the spaces 'between political or cultural entities where geographic, political, demographic, cultural, and economic circumstances or processes may interact to create borders or frontiers'.[4] The fact that the concepts of boundaries and borderscapes[5] encompass material and nonmaterial boundaries, and focus on how people perceive and influence borders, makes it crucial to attempt to grasp their complexity and nuances using different analytical approaches.

One useful methodology to deploy is the technological approach to analyse archaeological material because it makes it possible to highlight technical traditions and the boundaries that exist between them. By 'technical tradition' we mean a recurring way of doing things that is transmitted from generation to generation within a given social group.[6] The identification of technical traditions, therefore, makes it possible to investigate the dynamics of their transmission, their diffusion, and the characteristics of production, and consequently to obtain an anthropological reading of artefacts.

Many ethnographic, experimental psychology and neuroscience studies have indeed shown how transmission processes consist of long apprenticeships carried out within a given social group (family, gender, workshop, village, religious community, linguistic community, etc.).[7] Usually, apprenticeships begin in childhood, with an initial moment based on observation and simple tasks, to then evolve over time. By the end of this process, the apprentice will have internalised a series of gestures and automatisms that will then be very difficult to change.[8] Especially when it comes to gestures and techniques that do not interfere with the final appearance of the product. In the case of ceramics, this concerns various aspects of production, and in particular the first stage of pottery making: the rough-out stage. At this stage, various techniques such as moulding, percussion, various coiling methods, wheel throwing, etc. can be adopted to make a certain type of shape, without the techniques adopted having an effect on the final shape. This causes the potter to adopt the techniques he was taught during his/her apprenticeship and to tend to keep using them thereafter. It is precisely this phenomenon that ensures that technical traditions remain extremely stable over time and is useful in identifying boundaries between different groups of potters. Technical traditions are therefore linked to the specificity of the group of potters who employ them,[9] and make it possible to move away from the custom of identifying ceramic categories with 'cultures', rightly criticised as 'pots are not people'[10] to a more complex concept of technical traditions correspond to craftspeople.[11]

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[4] Parker 2006: 80.

[5] 'Borderscape' is a conceptual approach that focuses on the experiences of those living in borderlands and the way they conceive, feel and experience the landscape in which they live. Consequently, it is a way to emphasise the impact of human action on the borders and how the latter influence the social possibilities for the people living with it. Borderscapes are thus dynamic and constantly modified by human action (Brambilla 2015).

[6] Gosselain 2000; Roux 2019.

[7] Reed, Bril 1996; Bril 2002.

[8] Dobres 2000; Gosselain 2000.

[9] Gosselain 2000; Stark, Bowser, Horne (Eds) 2008; Roux *et al*. 2017; Roux 2019.

[10] Kramer 1977.

[11] Baldi 2013.

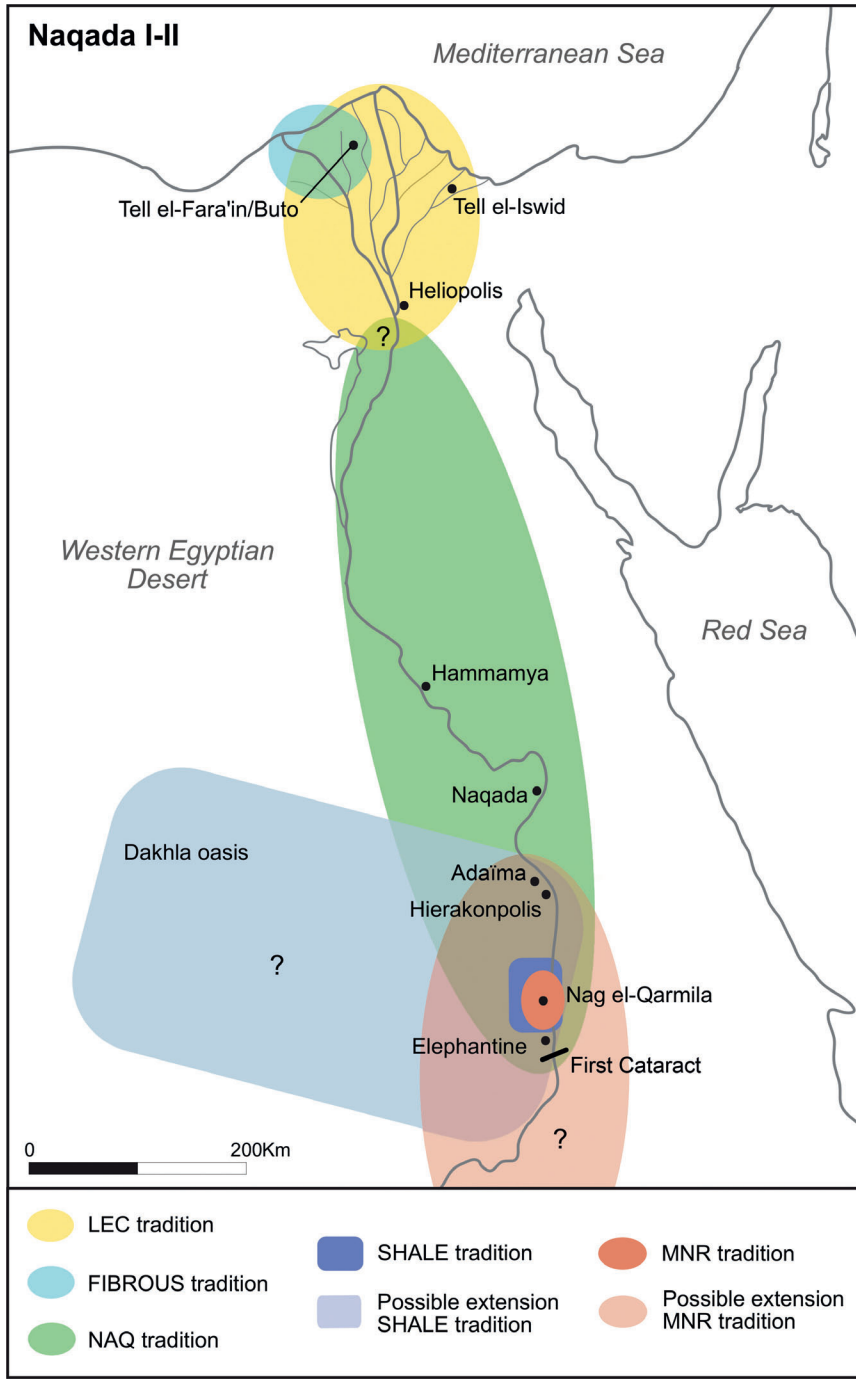
We therefore move from 'cultures' to 'ways of doing',[12] investigating the sociological and anthropological sphere of archaeological material and the way of thinking of ancient communities. Objects are, in fact, the expression and product of artisans and embody their particular way of making, their organisation, their differences, their technical identities and their traditions,[13] as demonstrated by numerous anthropological studies.[14] Once the technical traditions have been identified, that is, once the entire *chaîne opératoire* for the production of a given object has been reconstructed, from the collection and processing of the raw material to the finished object, it will be possible to study their geographical and temporal diffusion in order to analyse the relationship and interaction of a given technical tradition with neighbouring ones and, from a diachronic point of view, to see their evolution over time.[15]

Clearly there is no direct way of interpreting the nature of the social group (community of practice) to which the artisans belong, the possibilities are manifold (gender, language, clan, ethnicity, guilds, family group, professional community, religion, itinerant potters, etc.) and it is the evidence from the archaeological context and data obtained with other methodologies that usually allow us to identify it.[16]

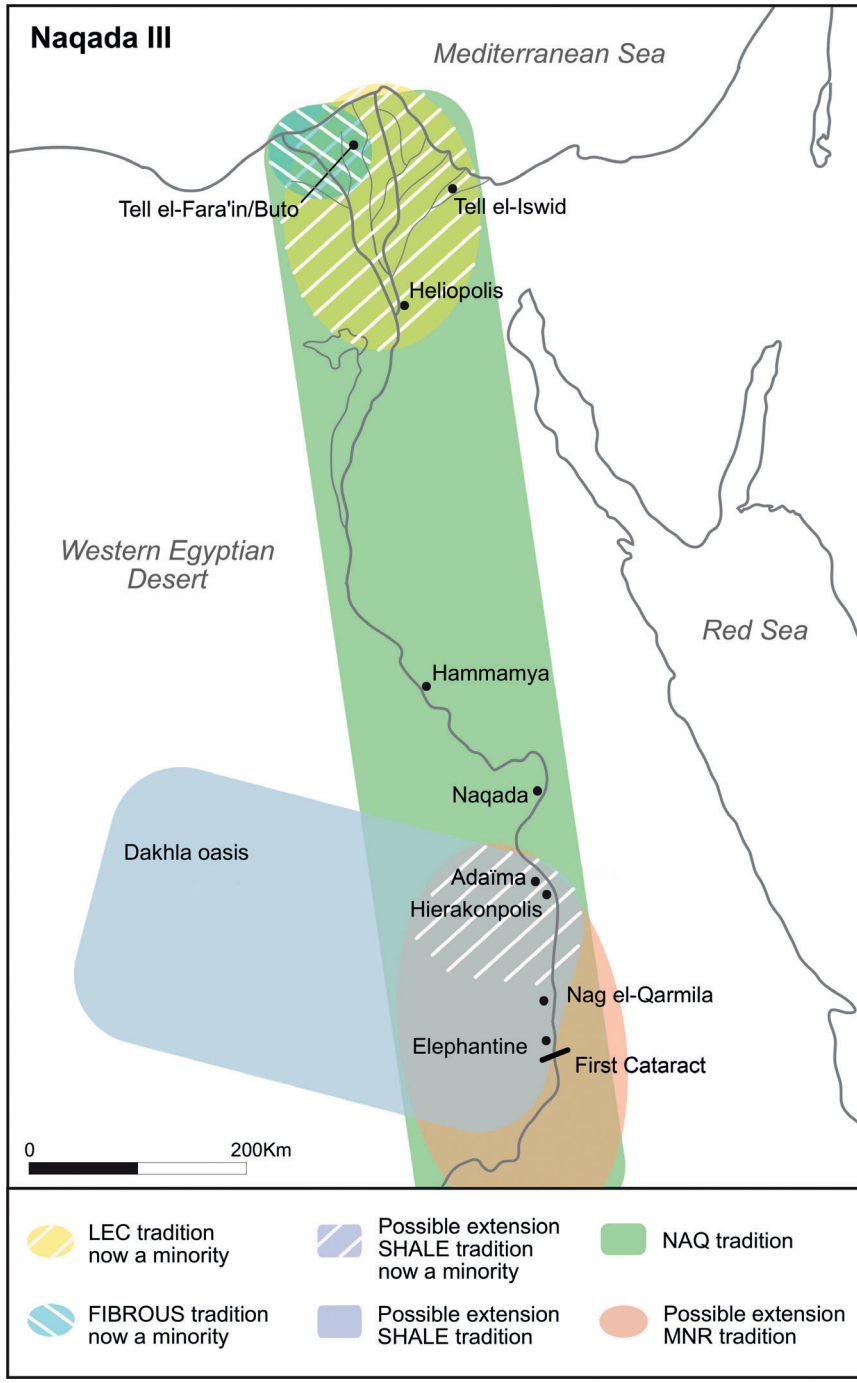
The possibility of reading archaeological material from an anthropological perspective and grasping cultural dynamics is particularly important in prehistoric and protohistoric contexts, where material culture is the main data we have at our disposal. Given these characteristics, it is clear that such an approach, combined with data from archaeological contexts and other approaches, can be particularly useful in the study of borderscapes, especially in order to read their nuances and go beyond the concept of 'border' as a physical dividing line between two communities (e.g. border between Egypt and Nubia). Here we mean tangible and intangible borders, from the actual border area to boundaries between technical traditions.

As an exemplification of this methodological frame and of its potential to investigate borderscapes, case studies from the Delta, the Nile Valley and the First Nile Cataract during the Predynastic period (fourth millennium BCE) will be presented here, and the interaction and evolution over time of the various technical traditions identified will be analysed (**Figs 1–2**). The data included in this paper have already been published individually in various articles.[17] But, this contribution provides an opportunity to resume them as a whole and to compare the situation at both ends of Egypt, the Delta and the First Nile Cataract, to highlight the various aspects of technical boundaries and how they changed with the dynamics of state formation.

[12] Baldi 2013.
[13] Baldi 2013.
[14] Gelbert 2003; Gallay, Kalapo, Guindo 2006.
[15] Roux 2019.
[16] Stark 1998; Roux *et al*. 2017; Roux 2019: 5–6.
[17] Bajeot, Roux 2019; Bajeot, Buchez 2021; 2022; Bajeot, Ownby, Gatto 2024.



1. Map showing the approximate diffusion of the technical traditions and the sites mentioned in the text during Naqada I–II; the reconstruction of the fourth millennium coastline is based on: Coutellier, Stanley 1987: Fig. 7; Stanley 2002 (Elaborated: J. Bajeot).



2. Map showing the approximate diffusion of the technical traditions and the sites mentioned in the text during Naqada III; the reconstruction of the fourth millennium coastline is based on: Coutellier, Stanley 1987: Fig. 7; Stanley 2002 (Elaborated: J. Bajeot).

TECHNOLOGICAL BOUNDARIES IN PREDYNASTIC EGYPT

Technical traditions

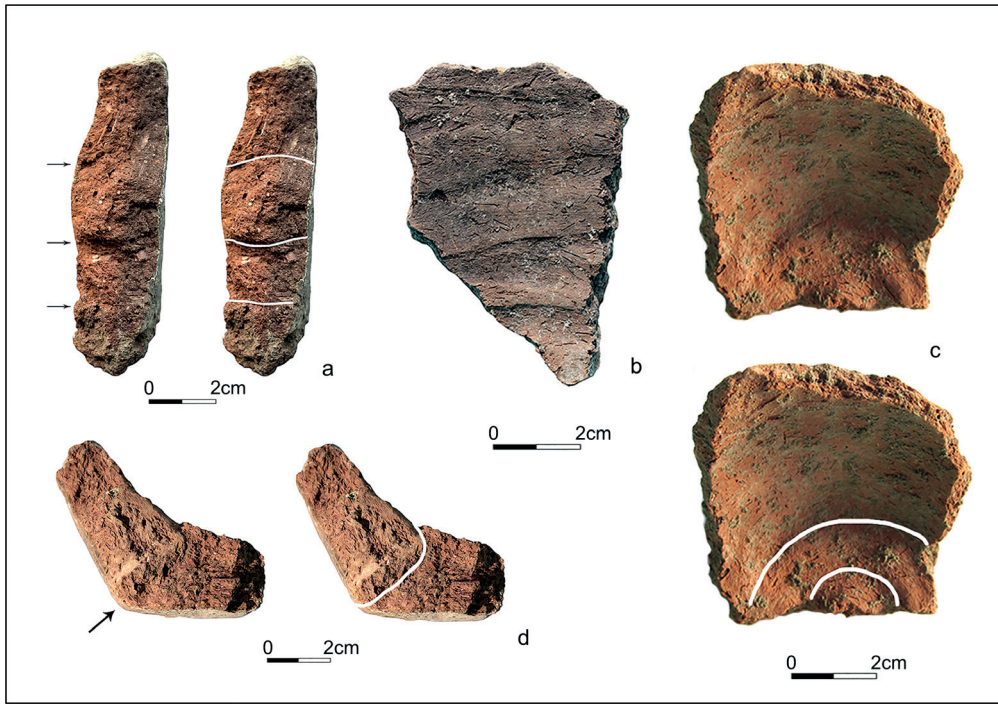
The technological analysis carried out by the author since 2017 has made it possible to identify five different technical traditions for the production of pottery in Predynastic Egypt in the fourth millennium BCE, and to partly follow their mutual interaction and evolution over time (**Figs 1–2**).[18] The various groups are illustrated by going from north to south: LEC, FIBROUS, NAQ, SHALE, MNR.

The LEC technical tradition,[19] widespread in the Nile Delta, is characterised by a Nile clay paste tempered with abundant plant fragments of slightly varying size and quantity, and minerals probably from the clay deposit. It is a poorly worked dough, as evidenced by the numerous vacuoles left by air that were not completely removed during the kneading phase. The vessels were built with a spiral coil. The first coil of the wall was directly fixed on top of the peripheral coil of the base, and then other coils were added one on top of the other with discontinuous pressures. This technique gives in radial sections horizontal/U-shaped coil joints. This fabric was used to make all types of vessels found at Delta sites, from bowls to storage jars. Once made, the vessels could be smoothed or burnished and sometimes decorated with abstract impressed motifs. Vases from this group are usually fired in an oxidising atmosphere, with surfaces tending towards beige, brown and reddish, but in radial section are often characterised by a black core (**Figs 3–4**).

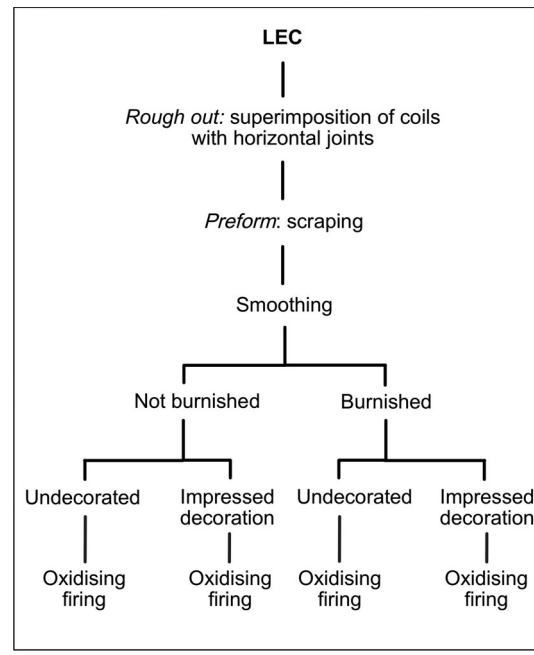
This technical tradition remains stable over time, contrary to the shapes and decorations that change according to the needs of the community using them. Virtually all the pottery produced in the Nile Delta sites until the phase Naqada IIIA2–B is made according to this

[18] The results were obtained by analysing diagnostic and non-diagnostic sherds and complete pots from several sites (from excavation layers and *in situ* and non-*in situ* contexts). For the Delta, samples from the following sites were analysed: sector 4 of Tell el-Iswid (*c*. 140,000 samples, analysed on the excavation field, director of the excavation Nathalie Buchez), Tell el-Samara (*c*. 4000 samples, analysed on the excavation field, director of the excavation Frédéric Guyot), Tell el-Fara'in/Buto (50 samples, analysed on the excavation field, director of the excavation Ulrich Hartung), Heliopolis (*c*. 200 samples kept in the Museo Egizio of Turin and analysed by Jade Bajeot and Vanessa Forte in the frame of the PrEMuC project led by Giulio Lucarini and Federica Ugliano; the results will be published with the accomplishment of the project). For the Nile Valley we have: Gebelein and Hammamya (*c*. 230 samples kept in the Museo Egizio, Turin, curator Federica Ugliano), and Toukh, Kom el-Akhmar, Gebelein, Adaïma, Silsilah, Naqada (*c*. 340 samples kept in the Musée d'Archéologie Nationale – Domaine national du Château de Saint-Germain-en-Laye, curator Christine Lorre). Finally, for the First Nile Cataract region we have: WK14 and WK15 in Nag el-Qarmila (*c*. 4,100 samples, stored in the warehouse of Kom Ombo), NH16 in Nag el-Hamdulab (*c*. 3,000 samples stored in the warehouse of Aswan), all excavated by the Aswan-Kom Ombo Archaeological Projecg (AKAP) led by Maria Carmela Gatto and Antonio Curci). All the available samples have been studied, except in the case of Tell el-Iswid where, due to the large quantity of sherds, after an initial phase in which all the material from the excavation was analysed and the technological groups were identified and well defined, sampling was carried out.

[19] It takes its name from the Lower Egyptian Culture. For a detailed description of this technical tradition and its evolution see: Bajeot, Roux 2019; Bajeot, Buchez 2021; Bajeot 2024.



3. Exemplification of the LEC *chaîne opératoire*: a. horizontal joints visible in the radial section; b. coil undulations; c. concentric undulations visible inside of the base and witnessing a spiral coil; d. junction of the coil at the periphery of the base (Phot. J. Bajeot, © Tell el-Iswid).



4. Technical tree of the LEC *chaîne opératoire* (Elaborated: J. Bajeot).

chaîne opératoire (**Fig. 1**). At Tell el-Iswid until the Naqada IIIA phase[20] it constitutes more than 90% of the total pottery and is flanked by a few imported vessels belonging to other groups.[21] It is only with the Naqada IIIA2–B phase (**Fig. 2**) that we see it drop dramatically below 20% in favour of the NAQ *chaîne opératoire* (see below).

The characteristics of this group, such as the use of a single fabric to manufacture all the shapes and a non-functional use of the surface finish, point towards a domestic production. Unfortunately, due to the lack of archaeological data on production sites and the fragmentary state of the ceramic repertoire, it is difficult to work on the concept of specialisation in Predynastic Egypt, particularly for the Lower Egyptian Culture, and to reconstruct the local production system before the change that occurred with Naqada III. Consequently, it is difficult to better define the character of this domestic production. Based on the data being collected at Tell el-Iswid – which will be the subject of a monograph in the near future – a change in settlement organisation (cf. change and increase of storage areas) and ceramic production can be observed over time.[22] Hopefully, the work of cross-referencing data in preparation for publication will allow for a better understanding of the characteristics of this ceramic production and its evolution, and how it was impacted by the dynamics of state formation in their early stage.

The technical tradition FIBROUS[23] is found in significant quantities at Tell el-Fara'in/Buto in the western Delta, and in very small quantities throughout the rest of Egypt.[24] It is characterised by a paste of clay and minerals from the supply deposit to which a moderate amount of long, fine fragments of plant material was added. This fabric was mainly used to make small, medium and large closed shapes, with a globular profile, and a few rare bowls. The technique used to assemble them is that of spread coils, which is evidenced in radial section by oblique and very elongated coil joints, followed by the percussion of the outer walls to finalise the shape. All the vessels in this group are burnished and sometimes the shoulder of closed forms is decorated with a series of dense oblique dashes forming one or more overlapping lines and, more rarely, some kind of garland (**Figs 5–6**). The surfaces of the vases are usually brown and often mottled. This *chaîne opératoire* also remains stable over time, except for the preparation of the paste, which becomes coarser over time.

The geographical and temporal distribution of this group characterised by small percentages present throughout Egypt (around 1%), with the exception of western Delta (Tell

[20] Buto IIC, formerly Buto IIIa, according to the new relative chronology proposed by Ulrich Hartung for Tell el-Fara'in/Buto (Hartung *et al*. 2019).

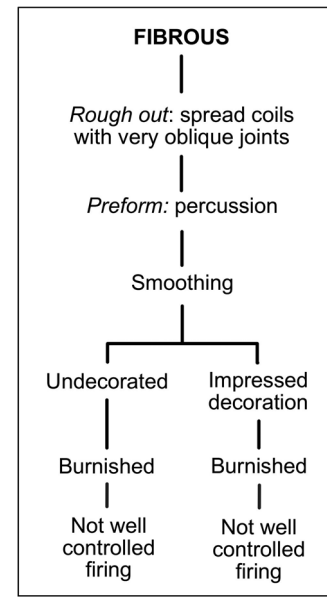
[21] The imported pottery consists of marl clay vessels from the Nile Valley, as this raw material is not available in the Delta, and ceramic vessels from the Levant. We also have a small percentage of fragments made with Nile silt and plant temper, made according to the NAQ technical tradition that could have been imported or produced in the region. The very small quantity of the latter makes us lean towards the hypothesis of importation, but a local production by ceramists belonging to the NAQ tradition cannot be excluded.

[22] Buchez *et al*. 2022.

[23] This group takes its name from its particular temper and also from its name in literature 'Fibrous Ware'. For a detailed description of this technical tradition and its evolution see: Bajeot, Buchez 2022; 2024.

[24] Hartmann 2017.

5. Exemplification of the FIBROUS *chaîne opératoire*: a. very elongated joints visible in the radial section; b. complete pots with impressed decoration, burnished surface, and flattened areas left by paddling (a. Phot. J. Bajeot, © Tell el-Iswid; b. Phot. F. Raux, RMN, courtesy of the Musée d'Archéologie Nationale, Domaine national du Château de Saint-Germain-en-Laye; the CC BY license does not apply to this illustration).



6. Technical tree of the FIBROUS *chaîne opératoire* (Elaborated: J. Bajeot).

el-Fara'in/Buto) where it increases in quantities up to 30% with the Naqada IID2–IIIA1 phase (Buto IIC) (**Figs 1–2**),[25] before decreasing everywhere and disappearing by the end of the Predynastic Period, has led to a suggestive and somewhat provocative hypothesis. According to the latter, this ceramic tradition is the expression of a nomadic or semi-nomadic group primarily concentrated in the western Delta, which perhaps also moved across the rest of the country, or whose ceramics circulated through exchanges along the Nile Valley.[26] Although this hypothesis is currently difficult to verify due to the challenges of studying nomadic phenomena that leave very few traces on the ground,[27] researchers have shown that it is possible to identify mobile potters on the basis of petrographic and technological analysis.[28]

The NAQ technical tradition[29] in its initial stages is widespread throughout the Nile Valley, from Middle Egypt to the First Nile Cataract and well into Lower Nubia (**Fig. 1**).[30] At the current state of the author's studies, in its earliest phase (Naqada I), it is represented by a single type of fabric made of Nile clay with a small component of minerals originating from the deposit of origin (called NAQ-SILT).[31] Given the purity of the clay, it is suggested that the potters either found deposits of clay that was already quite pure, or performed decanting or sieving activities to obtain the desired result. This paste was used to make Black-Topped and Red-Polished pottery by assembling a spiral coil for the base, stretching the peripheral coil of the base to attach to it the first coil of the wall, and then coils attached by internal apposition and resulting in oblique joints in radial section. The shape was then finalised by shaving, a technique that involves 'cutting' pieces of clay with a sharp instrument on leather-hard clay.[32] These vessels were then slipped and burnished. Red-Polished pots were fired in an oxidising atmosphere, while Black-Topped pots were fired

[25] Hartmann 2017.

[26] Bajeot, Buchez 2022; 2024.

[27] Barnard, Wendrich 2008; Smith 2008.

[28] See among others Boileau 2005; Alden, Minc 2016.

[29] Named from 'Naqada'; name commonly used in the literature.

[30] For a detailed description of this technical tradition and its evolution see: Bajeot, Buchez 2021; Bajeot, Ownby, Gatto 2024. Concerning typology and relative chronology see, among others: Friedman 1994; Gatto 2006; Buchez 2008; Hartmann 2016.

[31] Renée Frances Friedman identified three fabrics for the domestic production of cooking pots each one typical of a specific region: grog-tempered for Khattara, plant-tempered for Hammamya and shale clay for Hierakonpolis. These domestic productions were flanked by the typical naqadian pottery such as the Black-Topped and the Red Polished that are found the same in the three regions. Currently, the present author has only analysed the cooking pots made of shale clay and it has been possible to ascertain that these vessels were made according to a different *chaîne opératoire* (SHALE, see below), and which consequently, were not made by the same potters. It would be necessary then to verify if the grog-tempered and the plant-tempered ceramic were also made according to different (and still unknown) manufacturing processes or if they belong to the NAQ group. Unfortunately, no grog- and plant-tempered material from Hammamya and Khattara was found in the collections kept in the museums and studied by this author. The analysis in the near future of the complete ceramic corpus from the settlement and necropolises of Adaïma will possibly shed some new light on this topic (Friedman 1994; Vermeersch, van Neer, Hendrickx 2004; Anderson 2006).

[32] Roux 2019.

with a combination of oxidising and reducing atmosphere to obtain a red body and black rim (**Figs 7a-c, f, 8**).

The Naqada IC phase sees the appearance of a new fabric of Nile clay tempered with abundant plant material (NAQ-VEG).[33] The vessel construction technique is the same as described above. The surfaces are generally smoothed and the firing carried out in an oxidising atmosphere (**Figs 7e, 8**). With this fabric, various shapes were made, including bowls, basins, storage jars (especially the so-called beer jars), bread moulds and cooking pots.

During the Naqada II phase, a third fabric emerges (NAQ-MIXED), consisting of a fine, well-processed and compact paste made from marl clay from various deposits located on the edge of the desert along the Nile Valley. It is likely, however, that there are also other types of clay in this group that look similar and are difficult to distinguish with the naked eye.[34] This fabric was first used to make painted D-Ware pottery, and later also other unpainted shapes, mainly for serving and storage. The latter could be simply smoothed or burnished or softened,[35] some, especially those for serving, could be slipped and burnished (**Figs 7d, g, 8**).

Finally, in the Delta, with Naqada IIIA2–B (**Fig. 2**) NAQ-SILT is used to produce transport and storage jars, while a new fabric, NAQ-SILT-VEG, is introduced to make presentation and consumption vessels. The surface finishes are the same adopted for the counterparts of these vessels made with NAQ-MIXED and diffused in the Nile Valley.[36]

In the course of time, with the same *chaîne opératoire* we see a diversification of fabrics, surface treatments and shapes with a functional purpose, accompanied by the gradual disappearance of decorations. At the same time, we also see that initially this tradition, although predominant in the Nile Valley, seems to be accompanied by other traditions, as in the case of Nag el-Qarmila and Adaïma, where NAQ covers 40% of demand during Naqada I–IIB, and the rest is covered by SHALE, but then becomes the primary one, covering almost the entire demand for ceramics (**Figs 1–2**).

The characteristics of this *chaîne opératoire*, coupled with the aspect of the pots, suggest the presence of potters who specialised in the production of vessels with precise aesthetic and time-consuming characteristics who, at least at first, developed their production under the impulse of funerary cult-related needs[37] and, at a later stage, in the direction of a strong functional differentiation possibly due political and economic reorganisation linked to the birth of the state. During these processes that lead to the modification of production, workshops probably arose, although it is difficult to specify when they first appeared. It is possible that in the earliest phases (Naqada II) there were various scales of production, at least

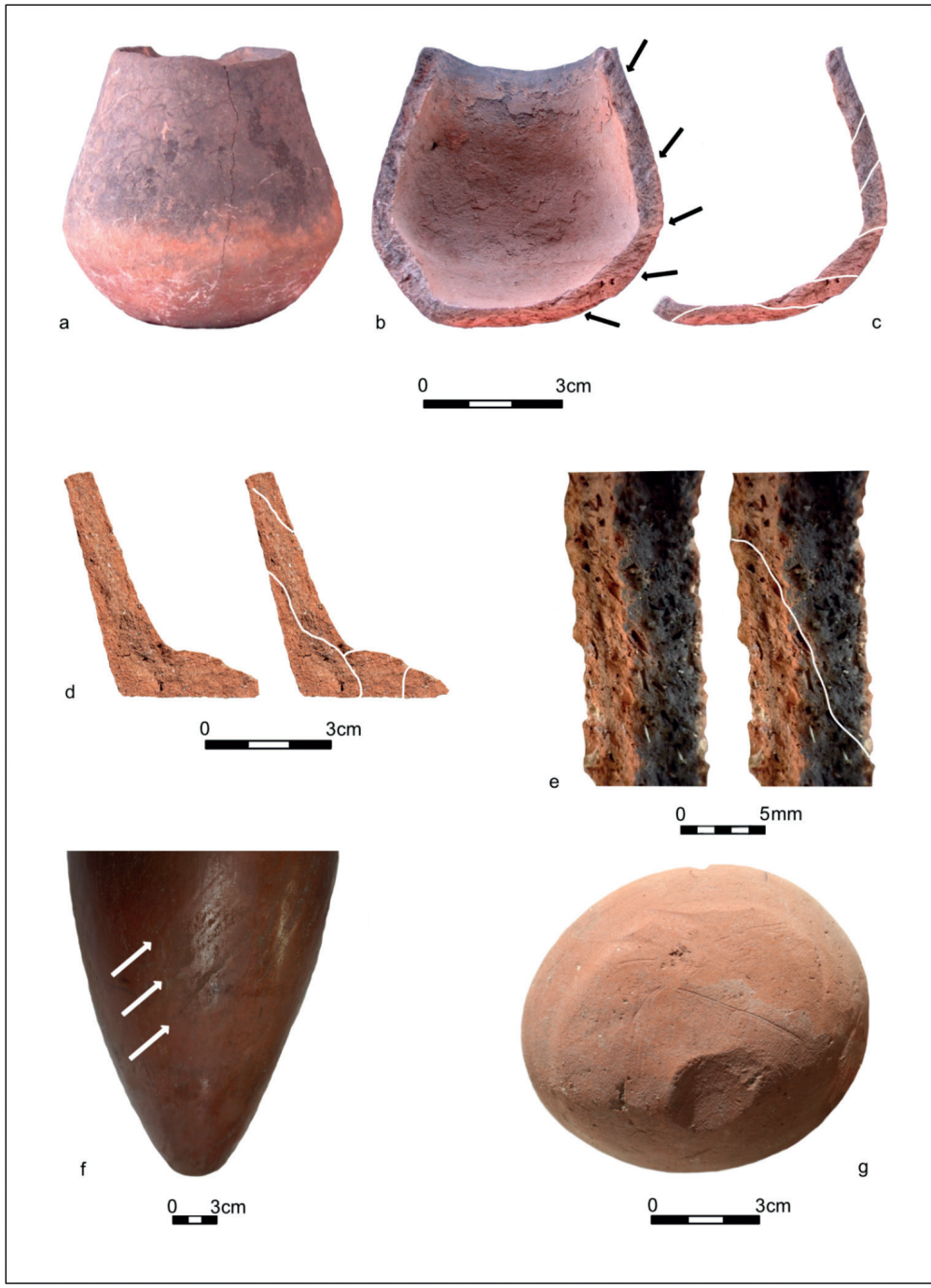
[33] A plant-tempered fabric is also present in the more ancient phases in the region of Hammamya, but we still need to verify if the *chaîne opératoire* is the same as the NAQ or different, as in the case of shale pottery (see footnote 30).

[34] Ownby, Köhler 2021; Bajeot, Ownby, Gatto 2024.

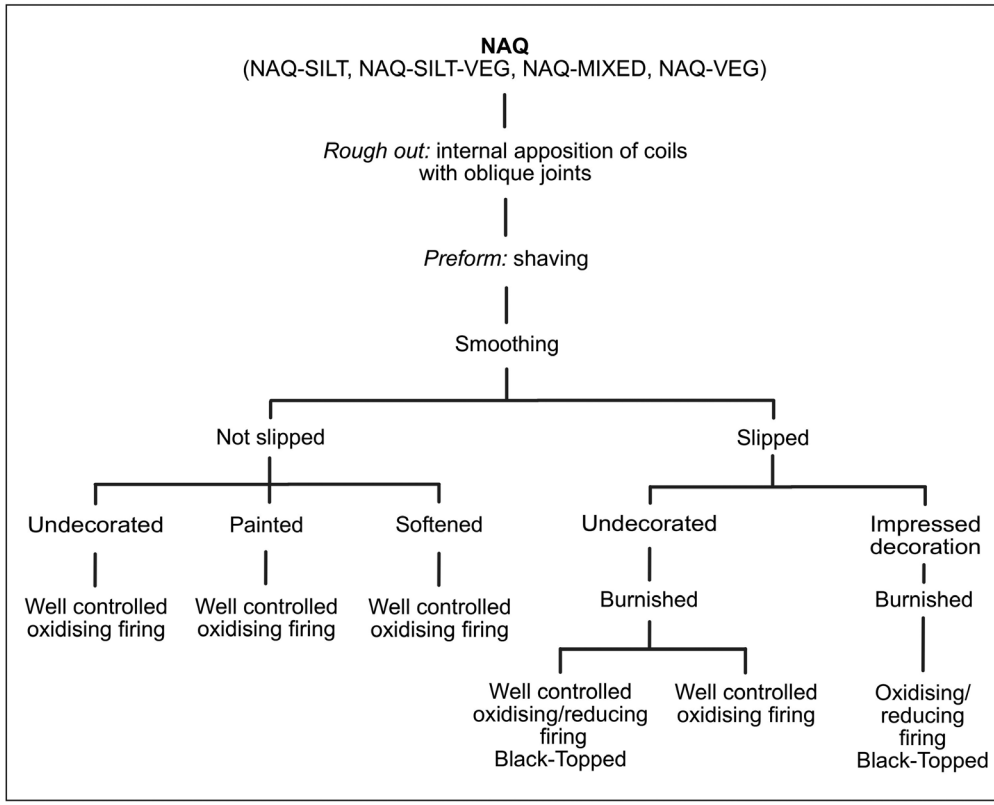
[35] Softening entails rubbing the almost dry surface of the pot with a rigid tool soaked in water (while burnishing is without the addition of water). The result is a very smooth, silky and mat surface (Roux 2019).

[36] Bajeot, Buchez 2022.

[37] Hartung 2018.



7. Exemplification of the NAQ *chaîne opératoire*: a-c. spiraled base and oblique coils visible on a NAQ-SILT vessel (Black-Topped); d. spiraled base and oblique coils visible on a NAQ-MIXED section (Wavy-Handle); e. oblique junction on a NAQ-VEG section (jar); f. shaving marks on a NAQ-SILT vessel (Black-Topped); g. shaving marks on a NAQ-MIXED bowl (Phot. J. Bajeot; a-e, g. © AKAP; f. © Museo Egizio, Turin).



8. Simplified general technical tree of the NAQ *chaîne opératoire*, without the distinction of the different fabrics present within this technical group (Elaborated: J. Bajeot).

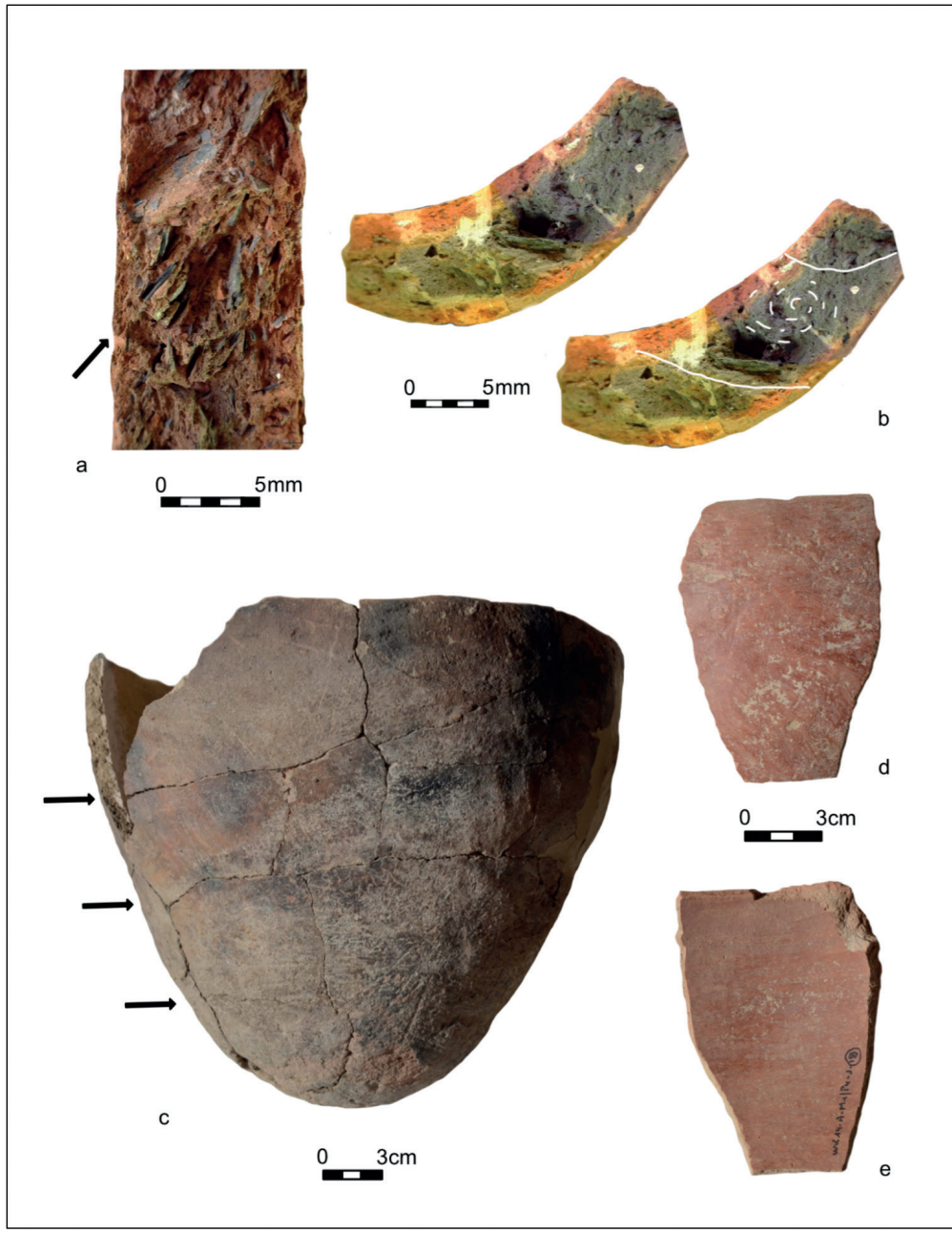
in the larger sites.[38] These elements suggest, at least for the more mature phase, a system based on specialist potters producing both utilitarian and fine ceramics and dependent on different authorities, different levels of control and individual agency, but all sharing the same technical tradition and therefore part of the same community of practice.

The SHALE technological tradition[39] is mainly spread between the Adaïma and Aswan regions, where it constitutes more or less important proportions of the ceramic assemblages (**Figs 1–2**).[40] Made from shale clay, it is marked by numerous shale fragments

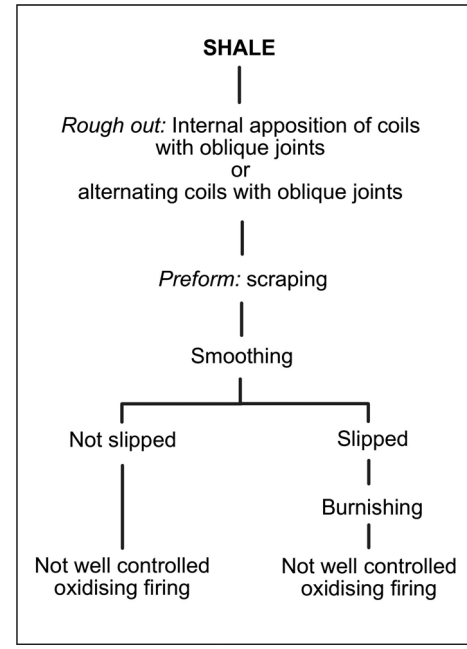
[38] Baba 2021.

[39] Named after the type of clay from which it is made and the Shale Ware known in the literature. For a detailed description of this technical tradition see Bajeot, Ownby, Gatto 2024. For typology, relative chronology and the presence of Shale Ware in the Egyptian Western Desert see also Buchez 2008; Friedman 1994; Gatto 2013.

[40] In the settlement WK15 in Nag el-Qarmila it constitutes almost 56% of the assemblage during phase 1 (Naqada IA–beginning of IIA), and 59% during Naqada IIC–IIIA. At Adaïma it makes 40% of the assemblage dated to Naqada IC–IIB. At Hierakonpolis we have 25% in HK14 and 18% in HK11 during Naqada IC–IIA (Friedman 1994: 630; Friedman *et al*. 2002: 59; Buchez 2008: 18; Bajeot, Ownby, Gatto 2024).



9. Exemplification of the SHALE *chaîne opératoire*: a-b. oblique coils and spiraled base; c. complete pot characterised by horizontal preferential fractures, finger impression on the median part, and scraping marks toward the bottom; d-e. possibly slipped and burnished surfaces (Phot. J. Bajeot, © AKAP).



10. Technical tree of the SHALE *chaîne opératoire* (Elaborated: J. Bajeot).

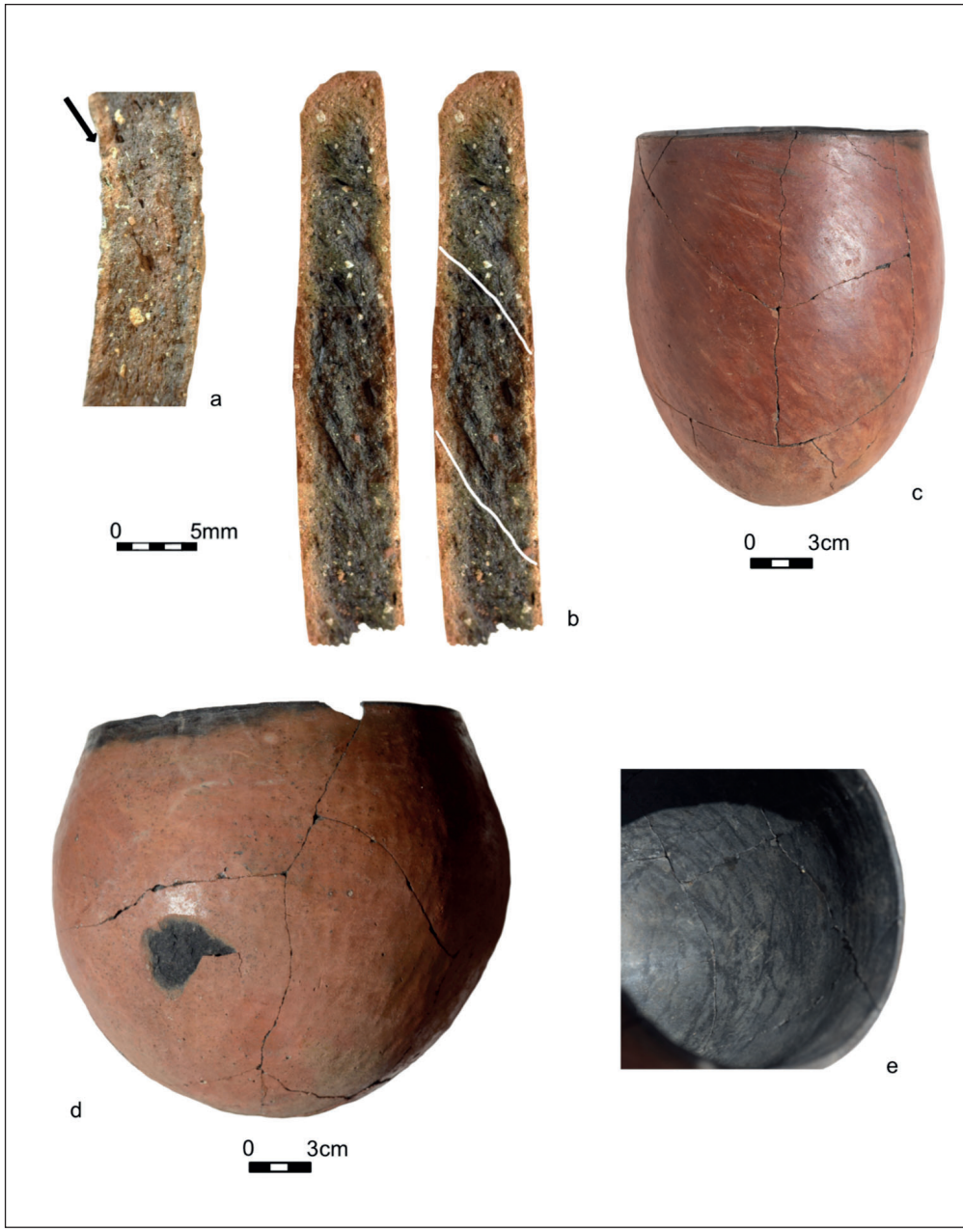
with a characteristic flaky appearance. The exploitation of several shale deposits, probably located in the First Cataract region, is recorded, at least in Aswan, but the presence of shale vessels from the Western Desert cannot be excluded.[41] The variety of deposits used is evidenced by the variety of shale clay found in the assemblage. This raw material was used without the addition of tempering agents to make bowls, some very deep bowls, the latter interpreted as cooking pots.[42] The technique for making them is using coils assembled with discontinuous pressures that give oblique or alternating joints in the radial section. The shapes were then finished by scraping the wet dough and then by smoothing and, more rarely, burnishing (**Figs 9–10**). Some specimens appear to have a slip that gives them a pinkish-red colour. These vessels very often have spotted surfaces, due to firing in an oxidising atmosphere that was not well controlled. In the case of this techinical tradition, both the *chaîne opératoire* and the forms remain stable over time.

This technical group, as already defined by other colleagues, seems to refer to a tradition of local origin or from the Egyptian Western Desert,[43] carried on in the domestic

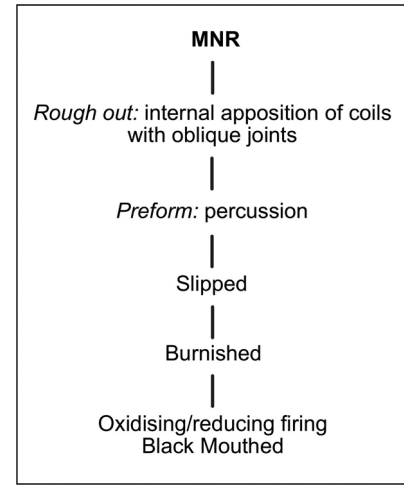
[41] This ware is in fact also present in the Egyptian Western Desert but it would be necessary (as also in the case of the Shale Ware from Hierakonpolis and Adaïma) to analyse it to establish if it belongs to the same technical group (Warfe 2018; Bajeot, Ownby, Gatto 2024).

[42] Friedman 1994: 633, 669; Buchez 2004.

[43] This type of pottery, with the same fabric, shape and finish has also been found in the Egyptian Western Desert and the oases of Dakhla and Kharga since the sixth millennium BCE. It is therefore necessary to establish the technological relationship between the shale we find in the Nile Valley and that of the desert in order to understand whether they belong to the same tradition and whether, therefore, this *chaîne opératoire* was



11. Exemplification of the MNR *chaîne opératoire*: a-b. oblique coil junctions; c. Black-Mouthed burnished jar with non-covering slip; d. Black-Mouthed jar with slightly rippled surface; e. Burnished internal surface (Phot. J. Bajeot, © AKAP).



12. Technical tree of the MNR *chaîne opératoire* (Elaborated: J. Bajeot).

sphere[44] within the same settlements where NAQ is produced. In fact, SHALE is also found in other sites located somewhat north of Nag el-Qarmila, such as Hierakonpolis and Adaïma.

The *chaîne opératoire* MNR[45] for the time being is documented in the Aswan region (**Figs 1–2**) and consists mainly of Black-Mouthed vessels made of an alluvial clay characterised by mineral fragments of varying size and nature, which are constituents of the deposit itself, and by small black-coloured plant fragments.[46] The vessels, mainly bowls and open, deep forms with a rounded or slightly pointed base, were made from small coils assembled with internal apposition (oblique coils junctions in the radial section), and the final shape was achieved by percussion from the inside, positioning the jar in a depression (or concave support) covered with a mat. In fact, the surfaces are often characterised by a slight rippled texture, more or less visible, left by the weaving of the mat (**Figs 11–12**). The vases, after

brought to the Nile Valley by potters from the oases who settled in the valley at the beginning of the fourth millennium BCE or whether they are two traditions that developed individually (question already raised by Friedman 1994: 892–893). When we see it appear in the Nile Valley in the fourth millennium BCE, it is most likely a local production, made in the region of Aswan (although contacts with the Egyptian Western Desert and the arrival of ceramics from this region as well cannot be ruled out), produced by different potters than those of the NAQ but probably belonging to the same communities. The continuation of technological analysis on ceramic assemblages from the Egyptian Western Desert could provide a better understanding of the genesis of this technical tradition and the relationship between the communities of the Nile Valley and those of the desert and oases.

[44] Domestic production would be suggested by a certain heterogeneity that characterises this technical tradition and which manifests itself in the use of different sources of clay supply, in a variable more or less coarse fabric, in coils with unidirectional or alternating oblique joints, in the use of different smoothing tools and, finally, in a great variability of vessel sizes.

[45] Named after the Middle Nile Region. For a detailed description of this technical tradition see Bajeot, Ownby, Gatto 2024.

[46] It constitutes 3% of the assemblage from the settlement WK15 in Nag el-Qarmila and 29% of the ceramics from the necropolis WK14.

being slipped with an instrument that often left streaks and burnished, were fired using a combination of oxidising and reducing atmosphere that resulted in the inner surface and outer mouth being black, and the remaining part of the outer surface red-brown. This *chaîne opératoire* and the shapes associated with it also remain constant over time. This technical tradition has been identified at Nag el-Qarmila, Aswan, in association with the NAQ and SHALE groups both in the settlement, with small quantities, and in the necropolis on a more consistent basis. It could be the expression of potters implanted in the wider region of the first cataract and perhaps dependent on a different subsistence strategy based on mobility.[47]

Interactions between the technical traditions

After having described the various groups, let us now look at how they interacted over time. The LEC group is mainly found in the Nile Delta, and is the typical tradition of the region from the earliest phases of occupation up to Naqada IIIA (**Fig. 1**).[48] With phase IIIA we see an increase in the import of NAQ pottery in the Delta, mainly marl clay, from the Nile Valley. With Naqada IIIB the NAQ technical tradition becomes predominant in the Delta and it is locally implemented to produce the same forms known from the Nile Valley but with river clay (NAQ-SILT and NAQ-SILT-VEG), locally available, instead of marl clay (NAQ-MIXED).[49] This probably corresponds to the establishment of production sites for this pottery in the Delta, as also evidenced by a simultaneous drastic decrease in the import of marl clay vessels. In this context, the presence of LEC pottery is significantly reduced. The limited typology of the forms and the presence of some imitations of typical NAQ forms suggest a production that followed different circuits from those of the NAQ, and that was used to complete, when necessary, the ceramic assemblages from the NAQ production centres (**Fig. 2**).[50]

The implantation of these new production sites, probably workshops, is likely to have been led initially by potters from the NAQ tradition, as evidenced by the use and teaching of their *chaîne opératoire*. Had it been the other way around, we would have had the fabrics and shapes typical of NAQ ceramics made with the LEC *chaîne opératoire*. This phenomenon is related to a change in the organisation of ceramic production, probably closely linked to the processes of the formation of the Egyptian state.[51] Indeed, we see the prevalence of one ceramic tradition probably handed down within workshops over the others, which become marginal.

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[47] Bajeot, Ownby, Gatto 2024.

[48] Bajeot, Roux 2019.

[49] Bajeot, Buchez 2021.

[50] Bajeot, Buchez 2021.

[51] We can, for example, think of a system of specialist potters producing both utilitarian and fine ceramics and dependent on different authorities, different levels of control and individual agency (as suggested by Warden 2011 for the Old Kingdom), but all sharing the same technical tradition and therefore part of the same community of practice.

The same phenomenon can also be seen in the case of the disappearance of the FIBROUS technical tradition that also seems to be linked to the emergence of the Egyptian state and the likely change in production organisation. Indeed, after reaching a quantitative peak in the western Delta during the Naqada IID2–IIIA1 phase, with Naqada IIIA2–B we register a drastic decline that follows more or less the same trend as the LEC.[52]

In the south, the situation presents differences but also convergences with the north. In the area of the First Nile Cataract, which with the birth of the Egyptian state will become the border between Egypt and Nubia, we have the co-existence of three technical traditions (NAQ, SHALE and MNR), all of them in substantial percentages. This area is represented by the southernmost predynastic settlement recently investigated, that of Nag el-Qarmila, consisting of a settlement and its necropolis.[53] Here, NAQ and SHALE are the predominant traditions in the main phase of the settlement (Naqada IA–IIA, respectively 44% and 59%), while in the necropolis we have substantial amounts of MNR (30%). The presence of these three technical traditions in the Aswan region, and particularly in a small site inhabited by a few families, such as Nag el-Qarmila, suggests a region characterised by different groups of potters belonging to different circuits of transmission of technical traditions. What seems to emerge from the analysis carried out in association with data from the landscape study within the Borderscape Project is that of an integrated and fluid system of relationships between sedentary and mobile communities. At present, we cannot define what types of relationships might have existed between these groups (matrimonial, collaborative and exchange, religious, etc.), but they certainly must not have been limited only to commercial exchanges. It must have been something more complex that allowed them to cohabit more or less in the same, very narrow spaces of the Nile Valley and the desert margins.[54] That contacts between the Egyptian and Nubian Nile Valleys were closer and more complex is also demonstrated by the early and constantly growing presence of Egyptian pottery in the A-Group cemeteries south of the First Nile Cataract.[55] Contacts that were interrupted, and then redrawn, with the consolidation of the Egyptian state.[56] Unfortunately, at Nag el-Qarmila we could not clearly see what happened with the emergence of the state because the most substantial occupation of the site is older and the surface layers, where more recent ceramics are found, are disturbed and therefore do not allow us to analyse the changes in the percentages of the various groups. The same is true for the cemetery where most of the tombs were also disturbed.[57] Moving, however, to the Hierakonpolis and Adaïma sites, where later phases are documented, we see that when NAQ-VEG forms are introduced the SHALE group slowly decreases in Adaïma

[52] Hartmann 2017.

[53] For a detailed description of the sites see: Gatto 2014; 2016; Gatto *et al*. 2009a; 2009b; Gatto, Siegel 2024.

[54] Bajeot, Ownby, Gatto 2024.

[55] A new study of the pottery found in A-Group cemeteries would be necessary to determine whether it was produced below the First Nile Cataract or whether it was all imported (Takamiya 2005; Gatto 2006).

[56] Takamiya 2005; Gatto 2006.

[57] Bajeot, Ownby, Gatto 2024.

and more rapidly in Hierakonpolis.[58] The NAQ-VEG, used to produce utilitarian forms, from a technological point of view does not derive (as one might have expected) from domestic SHALE production, but is developed within the NAQ technical tradition, taking up its *chaîne opératoire* in full, within the framework of this functional development and diversification that characterises the NAQ. The more sudden disappearance of the SHALE at Hierakonpolis than at Adaïma suggests an acceleration due to the elite that seems to have formed very early on at Hierakonpolis, and which probably stimulated the development of a more specialised production such as the NAQ. Adaïma, on the other hand, is a smaller site that seems to be affected later by these dynamics and shows how the timing probably varies from site to site depending on the characteristics of the site itself.

Basically, in the north and south we have two different starting situations that will later see, albeit with different timing, a similar development, namely the prevalence of the NAQ tradition over the others. In the Delta we have the development of a facies different from that of the Nile Valley as demonstrated by the various technical traditions (LEC and NAQ), and differences in settlement characteristics and in funerary practices.[59] Compared to the Nile Valley (up to the First Nile Cataract), where the NAQ originated and where it coexisted with other technical traditions from the beginning of the Predynastic period, contacts between Lower and Upper Egypt initially seem rather sporadic. They will intensify during the phase immediately preceding state formation and, when this process is complete, the NAQ tradition will be prevalent in both north and south.[60] To the south of Upper Egypt in fact the SHALE disappears, while the imports of NAQ in Lower Nubia also grow.[61] In this final phase we have the probable spread both in Upper and Lower Egypt of a new type of organisation of pottery production to which all inhabitants now refer. This new system seems to provide for almost the entirety of the pottery requirements and is indeed accompanied by a decline of the other technical traditions, handed down to a dwindling number of potters and, in the case of LEC, used to complete the NAQ pottery set. A substantial difference characterises instead the border area of the First Nile Cataract where the MNR tradition does not disappear and is found at least until the Second Intermediate Period.[62]

In this framework, we can see a similarity in the relationship between southern mobile groups (MNR) and the mobile groups possibly present in the western Delta (FIBROUS) and the settled communities of the Delta and the Nile Valley, albeit with their local specificities. For instance, MNR pottery plays an important role in the Nag el-Qarmila necropolis, while FIBROUS pottery is more rarely found in the graves of the Delta and Nile Valley sites.

At the current state of our knowledge, it would be necessary to analyse what happens from the technological point of view in the historical period: see if the LEC tradition persists in the north (and under what conditions) or if it disappears; analyse the evolution and presence of the MNR tradition and its interaction with the NAQ when the border

[58] Friedman 1994: 669–671; Buchez 2004; 2008.
[59] Buchez, Midant-Reynes 2007; Midant-Reynes, Buchez 2019.
[60] Guyot 2014; Bajeot, Buchez 2021.
[61] Takamiya 2005.
[62] Bajeot 2022.

between Egypt and Nubia is established and controlled (it would be particularly interesting to study the ceramic assemblages of Elephantine) and, finally, see if new technical traditions emerge in this new socio-political context, and how the prevailing NAQ tradition changes with the stabilisation of central power.

CONCLUSIONS

The results obtained from the technological study of ceramic assemblages from various areas of Predynastic Egypt, although still in its infancy, have allowed us to go beyond the traditional Upper/Lower Egypt and Upper Egypt/Nubia dichotomy, showing how the situation was more complex. In general terms, technical traditions (and consequently the technological analysis) help to reveal the existence of boundaries not only related to the territory but also to the organisation of human societies, not necessarily to be referred to ethnic differences but simply based on differences in social status, gender (male or female potters), domestic or workshop production, mobile or sedentary lifestyle, religious, linguistic, etc., and which can often be invisible if not researched with specific methodologies. In the case of Predynastic Egypt, the result is a more complex picture of the society in which relations between sedentary and mobile communities played an important role[63] together with the political factors and the associated economic interests that arose with the dynamics of state formation and that finally had a strong impact on the transmission of technical traditions.

The continuation of the work of mapping the technical traditions associated with the study of the landscape and new data from the excavations will, in the future, make it possible to better define the questions that currently remain open and to add new pieces to the reconstruction of the birth and development of the Egyptian civilisation.

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[63] The latter have hitherto been little studied because they are difficult to identify, but known in historical times thanks to written sources (Cooney 2011; Bestock 2018).

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