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PhD THESIS SUMMARY

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THE CRAFT OF PROCESSING POTTERY AS ILLUSTRATED IN THE COLLECTION OF THE NATIONAL MUSEUM OF THE UNION IN ALBA IULIA

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Introduction

The doctoral thesis entitled “The craft of processing pottery as illustrated in the collection of the National Museum of the Union in Alba Iulia”, coordinated by Cristian Ioan Popa, associate professor, PhD, focuses on analysing the manufacturing techniques of the archaeological pottery that is kept in the collections of the National Museum of the Union from Alba Iulia.

Chapter I

The apparition, diffusion and the social character of the pottery craftsmanship

The chapter presents the main aspects that define the manner of producing ceramics and the learning by copying reflex in the continuing of styles as reflected in the art of pottery or in “the decorative style of the ceramic vessels”. The spread of the ceramic manufacturing technology is dependent on several social factors manifested through a series of processes (endogenous and exogenous) of invention, learning, transmission, copying, adopting, perfecting with the finality in defining it as a technologic product with multiple roles; it also identifies the elements that compose the social.

The manner in which a certain social environment considers the ceramic as a support for expressing some concepts with artistical meaning or how the recipients are manufactured only for utilitarian purposes, plays an important role in this process. Several stages can be defined in the evolution of pottery, starting with manifestations belonging to the crafts and the household industry, the creation of specialised workshops, pottery centres and institutionalised production.

Chapter II

The ceramics collection of the National Museum of the Union from Alba Iulia and the directions of approaching the study of the processing technologies

The chapter presents the main periods and cultures that are discussed, that factors that have influenced the habitat in the central part of Transylvania and the manner in which the

museum's collection was created, detailing the most important discoveries and the cultural and chronological aspects are discussed in each case in a subchapter.

The manner of discussing the ceramic manufacturing technology follows the directions established by André Leroi-Gourhan with regards to the ethnology of techniques and the archaeology of gestures, as defined in his book "L'Homme et la matière" by the concept of "chaîne opératoire".

The research focuses on:

- Identifying from the historical, cultural and artistic perspective (the evidence of the archaeologic material)
- Replicating objects and / or techniques by paleo-technologic experiments
- Comparing them with ethnographic and ethnoarchaeological analogies
- Determining the manner of crafting through laboratory analysis (archaeometric investigations)

Chapter III

III.1. The pottery processing technology

The production of pottery represents the total sum of several interdependent stages from the manufacturing chain, such as: the raw material (clay), the degreasers that were used in order to change the clay's properties, the pigments or other materials used in decorating the pottery, the tools used for shaping and ornamenting, the firing ovens and the fuel that was needed in order to finish the physical-chemical process involved in the transformation of clay into ceramics.

Two types of interventions have been defined based on the manufacturing chain:

- General techniques, typical for a wide category of objects put in practice to order to shape and beautify the pots and that represent a generally valid characteristic for the entire ceramics produced in all the historical periods or during a stage;
- Special techniques, representing a series of approaches typical only for obtaining a certain kind of product; this is achieved through the specialisation of one or several stages from the inventory of general techniques

III.2. General techniques

The chapter presents the stages involved in the operational chain that fall in the category of general techniques. The operations that are characteristic for special techniques are discussed in the chapters pertaining to the historical period or the object category.

The first stage in manufacturing a ceramic vessel consists in obtaining the raw materials and preparing the clay by adding degreasers or removing the impurities.

The shaping is the stage in the general operational chain where the raw material is given shape through different manual techniques, by being pressed in moulds, by using pivoting systems or with the help of potter's wheel, a stage that is also called primary shaping or pre-shaping.

Defining the shape represents the second stage in the shaping process and is done through different techniques such as the paddle and anvil technique, by trimming, by smoothing the pot while it is still wet, by cutting away in order to modify and finish the aspect that results following the primary shaping.

The additional processing of the surfaces can be achieved by adding material (covering it with a slip, engobe, barbotine) or by smoothing and polishing as mechanical methods; the operations are designed to improve the physical properties of the vessels but may also represent components of the ornamental techniques.

The process of decorating the vessels aims at embellishing them and is achieved through tectonic techniques and/or painting, the manner in which it is put into practice reflecting the different specialisation degrees of the potters.

The drying of the clay vessels represents a mandatory stage in the manufacturing chain and is influenced by the climate conditions or the existence of opened areas designed for this operation. The existence of structures designed for manufacturing and drying ceramics means that the craft was practiced throughout the entire year.

The firing represents the physical-chemical process influenced by the temperature and the conditions of the burning gases through which the clay transforms in ceramic. The burning atmosphere is influenced by the presence of oxygen, or lack thereof; the chromatic effects are defined through oxidised firing (red colour) and firing in a reducing atmosphere (black colour) with a series of mixed aspects. These mixed aspects can be accidental or it may be that the potters fashioned them intentionally.

The process depends on the use of facilities or installations with a special destination; the building system influences the manner of control, the duration and the firing quality. One can define a firing that is done in open hearths or bonfires and three main types of kilns (with one firing chamber, vertical and horizontal). The presence of the evolved firing installations might be an indicator of specialisation, but this is not true for all the historical periods that were analysed.

Chapter IV

Ceramic shaping and ornamenting techniques in the Neolithic and Eneolithic

The first millennia in the craft of pottery making north of the Danube will be marked by experimenting different manners for transforming clay in ceramics, sometimes ennobled with ornaments rendered by various more or less complex methods.

IV. 1. Starčevo-Criș culture

MNUAI has in its deposits a small number or archaeological materials belonging to the Starčevo-Criș culture. We would like to mention the discoveries from Alba county, from Acmariu, Galda de Jos-*Moșia A. Kemény*/*Tibrișor*, Săliște.

The development of the pottery craft in this period is characterised through a slow evolution, based especially on internal factors, that contribute in perpetuating common traditions in the ceramic manufacturing technology, across a wide area and over a long period of time. The technological leaps can be best observed around the centres that are densely populated, capable of sustaining the partial or total separation of this craft from the household occupations; such processes will contribute to developing pottery manufacturing and diversification technologies. The main characteristics consist in the past with organic materials used as degreaser and spherical forms; such properties will offer a good resistance to the thermic shock. Painted ceramics, one of the most suggestive artistical manifestation from this period, is not present among the materials that are in the collection of the museum. The ceramic inventory that is characteristic for this culture contains a vessel discovered at Acmariu that stands out, it is decorated with anthropomorphic relief representations. Experimental replications of red and white painted globular vessel modelling techniques have been proposed, alongside the spiral coil manufacturing methods.

IV. 2. The Vinča culture

The end of the Early Neolithic and the beginning of the Middle Neolithic is marked by a new southern impulse that conveys from the Balkan Peninsula the elements of the Vinča culture, bringing important changes in the pottery craft.

The collection of MNUAI has ceramic materials belonging to the A3 and B phases of the Vinča culture that were discovered at Alba Iulia-*Lumea Nouă*, Ghirbom-*Între Veli*, Limba-

Vărar, Petrești-*Groapa Galbenă*, Tărtăria-*Gura Luncii*. The analysis of the technological markers has allowed to identify crafting by using the coiling technique but the vessels thus manufactured do not show a strict specialisation of the potters, even though pottery workshops and ceramic firing installations are attested punctually. The shaping of the pottery is based on the self-sustaining of the weight through thick walls and by using shapes with slightly accentuated angles of incidence. The deep tectonic decoration is predominant, the painting being exemplified by red or white, polished engobes. The firing is proper, with a predominance of the accidental, mixed conditions, or in the *black-topped* technique; there are also artefacts that are uniformly, oxidised fired. The analysis of the manner in which the cups with pedestal foot have fragmented has shown several manners for compensating the areas that are vulnerable to mechanical or thermic stress, located in the joining areas of the subassemblies. The experimental replication of the manufacturing of this type of artefacts has confirmed the technologic character of the markers evidenced by the archaeological ceramics. Another paleo-technological endeavour consisted in replicating the shaping technique of figurines fashioned by joining together two coils of clay; the firing of the replicas has identified their fragmenting along the assembling edges, with possibilities for extrapolating the magical and ritual role of the shaping technique that was used.

IV. 3 The *Lumea Nouă* cultural group

Although the first research conducted in the location with the same name and the identification of this cultural group was achieved through excavations conducted by the Alba Iulia Regional Museum, a relative low number of specific ceramic artefacts are kept in the collection; they are represented by fragmentary artefacts discovered at Alba Iulia-*Lumea Nouă*, Cheile-Turzii-*Peștera Balica Mare*, Limba-*Vărar* and Petrești-*Groapa Galbenă*. The ceramic inventory consists mostly of small and medium-sized pottery with the hemispheric bowls decorated by painting predominant. The paste is degreased with finely grounded organic material, offering a porous structure confirmed by the measuring the water index absorption. The modelling was done with the coiling technique and the form was defined through the paddle and anvil and the trimming techniques. The painting consists of a white background of a carbonate nature, over which were applied various red motifs based on iron oxides. A black painting based on birch pitch obtained from birch bark was applied after the firing. Bands consisting of parallel lines that are placed horizontally, vertically or as garlands represent a frequent decorative motif.

The restoration of the technique of rendering the bands comprised of parallel lines involved the identification in the field of some sources of raw materials and their processing. Several manners of applying have been practices, using instruments inspired by the inventory of traditional pottery workshops.

The experimental endeavour supports the hypothesis that bands were drawn with the help of a wooden comb, allowing the controlled removal of the pigment. The look of our painting and the technologic errors that appeared are similar to the traces identified on the archaeologic ceramic. A complementary experiment consisted in producing birch pitch from birch bark by pyrolysis and testing its application on ceramic.

IV. 4. The Turdaș culture

The ceramic belonging to the Turdaș culture that is found in the MNUAI collections is low in numbers and is represented only through fragmentary materials coming from Petrești-*Groapa Galbenă* and Alba Iulia-*Lumea Nouă*. Traces of shaping in the coiling technique have been determined.

IV. 5. The Foeni cultural group

The late Neolithic is marked by a new migration from the Thessalian-Macedonian area that will bring north of the Danube cultural elements characteristic of the Foeni cultural group; the penetration of this cultural group in Transylvania and its synthesis with the Turdaș and Lumea Nouă autochthonous elements contributed to the creation of the Petrești culture.

The materials that belong to the Foeni cultural group come from discoveries from Alba Iulia-*Lumea Nouă*, Cheile Turzii, Petrești-*Groapa Galbenă* and Sântimbru-*În Țărmure la Ierugă* (*Gară*). One can notice a series or improvements in the craft of pottery making; these advances relate to the preparation of the clay by removing the impurities and advanced techniques in shaping, decorating and firing. The pottery has thin walls, very well polished; the firing technique is mostly *black topped* and in an oxidising atmosphere, at high temperatures. The painting that is applied before the firing and the ornamenting through polishing are the main characteristics of the decorative technological style. By analysing the technological markers one can notice a series of similarities between same-style artefacts, reflecting common manners of operating, adapted to each type of profile. The manufacturing of a tronconic vessel discovered at Petrești-Groapa Galbenă, with a polished decoration, and pilot tests regarding the influence that the different types of wood have in obtaining the *black-topped* effect, have been experimented.

IV. 6. The Petrești culture

The achievements of the potters from the Petrești culture represent a reference point in the evolution of the craft of the Transylvanian prehistoric ceramic processing, combining a special attention to the shaping of the pottery, their covering with a monochromatic engobe and bichrome or trichrome painting, applied before the firing.

The MNUAI collection has artefacts belonging to the Petrești culture, discovered at Alba Iulia-*Lumea Nouă*, Ampoița-*La Pietri*, Cheile Turzii, Ghirbom-*În Fața*, Ghirbom-*Cânepi*, Limba-*Vărar*, Petrești-*Groapa Galbenă,* Tărtăria-*La Luncă*, Sântimbru-*La Tărmure, La Ierugă (Gară)*, Uioara de Jos-*Gruiul lui Șip* etc.

The large quantity of ceramics has allowed for an approach that includes the main morphologic types and the particular modelling techniques as structured on the categories of painted or unpainted ceramic. Many technologic markers are present, reflecting the adaptation of the manufacturing methods depending on the morphology of the pottery. It was noticed the manufacturing in stages, in the coiling technique and different methods of assembling the cups with a pedestal foot; such operations identify specialised potters. The painting done with mineral pigments in nuances of red, white and black represent a defining trait of the ceramic. It was experimented with the crafting methods for the cups with a pedestal foot and for the carinated bowls. An important part of the paleo-technologic experiments was dedicated to recreating the ceramic painting techniques with different types of tools known through ethnographic analogies and archaeological research.

IV. 7-8. The Tiszapolgár culture and the Decea Mureșului cultural group

The end of the Petrești culture is due to the arrival in Transylvania of the communities from the Tiszapolgár culture and those from the beginning of the Bodrogkeresztúr culture.

The ceramic materials belonging to the Tiszapolgár culture and the Decea Mureșului cultural group are poorly represented in the MNUAI collection, with very few technological aspects that can highlighted. We have limited ourselves to replicating the manufacturing technology of a cup with a pedestal foot recently discovered at Rădești.

IV. 9. The Bodrogkeresztúr culture

The collection of the museum includes artefacts typical of the final stage of the culture, respectively the „toarte pastilate” level, discovered in Cheile Turzii, coming from the Orosz

Endré collection and archaeological surveys conducted in the Balica Mare cave, Petrești-*Groapa Galbenă,* Aiud-*Microraion* etc.

A drop in the quality of the craftmanship is noticeable; the pottery is small or medium in size, with relatively thick walls and a less careful finishing. The cylindrical-necked pots, pottery with a pedestal foot, dishes and bi-tronconic bowls with an exaggerated shoulder and rectangular pots. The painted decoration is encountered les frequently; the tectonic ornamentation techniques and the inlaying with a white substance are predominant. A large number of potshards from Cheile Turzii that show a polished decoration, positioned in rows of adjacent triangles, bands and other ornamental motifs, sometimes doubled by a white painting, were identified. The chemical composition of the inlaying was identified by using the sXRF analyses; phosphorous and calcium are predominant, indicating the use of calcinated and grounded bones as a colour base for the pigment. Following the paleo-technological experiments, a successful replication of the technology involved in manufacturing, polishing and the applying of the white solution, was achieved. The painting effects appear following the random adhesion of the pigment on the polished or unpolished vessel surfaces, the applying technique deriving from that of the inlaying.

IV. 10. The Coțofeni culture

The end of the Eneolithic is marked by a new cultural phenomenon called the Coțofeni culture; it spreads across wide areas of Romania, north-western Bulgaria and north-eastern Serbia.

The Coțofeni culture is the cultural phenomenon with the highest number of discoveries attested in Romania, but also deposited in the MNUAI collections.

The ceramic inventory covers the entire household inventory, with items designed for storing, manipulating, cooking and consuming different produces. The most common vessels are pots and dishes, cups and mugs, glasses, amphorae, different types of vessels for cooking or storing solid or liquid produces (pots), jar vessels or pottery with a globular body, jugs, *askos*-type vessels and with a draining tube, sauceboats, vessels that can be hanged. The decoration of the ceramic is mostly tectonic; the impressions, the varied combinations of incisions that cover most of the body of the pottery or the areas exposed to sight and the plastic elements applied as crests, girdles or “lentil beans” are predominant. During the final phase, the successive stitches (*Furchenstich)* forming complex, expressive motifs, with a “baroque” look, become the predominant decorative technique. The shaping is done through the coiling technique and shows a very good finishing of the surfaces; fragmentation along the assembly

lines is rare. The techniques for manufacturing the tronconic pots, with a funnel-shaped mouth were experimented with; the inward arching of the walls in the neck area of the vessels contribute to their stability during the shaping phase. The technique for applying sprayed barbotine were practiced on the same pottery; the optimal method consists in hitting the surface with a brush soaked with diluted clay. We also focused on replicating the techniques for manufacturing round-bottom cups, high-swung handles and decorating them with incisions and inlaying.

Chapter V

Bronze Age ceramic

V. 1-3. The Early Bronze Age

The Early Bronze Age is documented through the Livezile-type discoveries, belonging to the first stage, through the Șoimuș and Copăceni cultural groups characteristic of the middle stage (BT II) and materials characteristic for the manifestations from the end of this period, fewer in numbers.

The materials that are kept in MNUAI collection are few in numbers but have allowed the identification of technological markers and characteristic specific for this period. In the early stage, in the Livezile cultural group, one can note influences from the Late Eneolithic particularly in the manner in which the pottery is ornamented; such influences will fade out in the late stages, with the elaborate decoration disappearing almost completely from the ceramic manufacturing chain. The manufacturing technique are the traditional ones, based on the manual coiling technique, but one can notice a spread of vessels that have thin walls. The archaeological inventory that relates to the craft of pottery is not archaeologically documented and the analysis of the low quantity of ceramic that is stored in the MNUAI collection could not identify elements characteristic for the specialisation of the potters. The experimentation has allowed the identification of two techniques used in obtaining ceramic with striations and/or textile decorations, the surfaces with a „rustic” look can be obtained by scratching with a comb or a small brush from elastic fibres when incisions are obtained. The textile decoration is the result of the pottery being hit with tree bark or wooden tools wrapped with a textile chord woven in different manners.

V. 4. 1. The Wietenberg culture

The collections of artefacts belonging to this culture and preserved in the MNUAI collection is very rich and diverse, allowing for a detailed presentation of the main morphologic types and ornamental styles.

The Wietenberg ceramic represents the result of an evolution that is organically connected to the Early Bronze traditions, manifested with reduced energy during the early period; it will diversify starting with the classical period and will reach its highpoint during the late stage of this culture, the ceramic becoming a support for the manifestation of artistic and spiritual values.

The techniques that were used are very well documented through a large number of specific technological markers, denoting identical manufacturing methods for vessels with similar shapes. Although the decoration follows certain rules, it is expressed freely, characteristic for each potter based on its experience and is rendered on carefully shaped vessels. The demands for a certain type of pottery, with a certain shape, quality of finishing and elaborate decorations, led to the appearance of specialisations, reduced to small local craftsmen but also to the (probable) appearance of true "specialists", supported by communities. The incipient ornamentation techniques, based on simple tectonic interventions (incisions, impressing, grooving), become more and more complex; a characteristic inventory of tools appears, helping to put in practice more and more elaborate, "baroque" motifs, formed by merging several methods used for composing the motifs (successive or simultaneous stiches, broadband impressions). Based on these technological indicators, several methods for crafting bi-tronconic vessels, bowls with different profiles and diferent plastic objects, were experimented. The recreation of ornamentation techniques has identified different methods of rendering the same type of decoration, with reflection in the final aspect as identified following the analysis of the archaeological ceramic.

The archaeometric analyses have allowed the identification of two sources of raw materials for manufacturing the ceramic discovered at Geoagiu de Sus, dated in the final stage of the Wietenberg culture; the artefacts that had an elaborate decoration were fashioned from a different clay as compared to the standard ceramic. The same type of investigations have identified that a ceramic of lower quality as far as the firing is concerned was deposited in funerary sites.

V. 4. 2. The Noua culture

The penetration of the Noua culture communities in Transylvania will lead to a gradual decline of the art and craft of pottery making, although, initially, the influences from the Wietenberg culture are felt. The materials belonging to the Noua culture, that are kept in the MNUAI collection mostly originate in the funerary inventory of necropolises researched in Alba county.

The only "creations" of relative aesthetic value orbit around a single form, that defines this cultural phenomenon, a vessel ("kantharos") with massive handles, with a button attached to them, attributed to their own traditions; this is also justified by its extremely frequent presence in funerary inventories. The technological innovation is manifested through reducing the size of the pots, the shaping of simple profiles and a scarcity of decoration as compared to the previous period. The identified modelling techniques are the coiling technique and the reinforcement of the handles through various means. The techniques for attaching the massive handles and the manner of rendering the decoration have been experimented.

V. 5. The Late Bronze

The cultural manifestations that are characteristic for this period belong to the Cugir-Band cultural group and the Gáva culture.

V. 5. 1. The Cugir Band group

New cultural elements are grafted on the late stages of the Noua culture; such elements originate in the central European areas and in the Pannonian Plain and they will form in Transylvania the Cugir-Band group, with the contribution of each component far from being established.

The archaeological materials from this culture that are kept in the MNUAI collection were discovered at Cugir-*Pârâul Gugului*, Alba Iulia-*Cigaș*, Băcăinți-*Obreje*, Teiuș-*Gară* și Uioara de Jos-*Grui*.

The newcomers come with elaborate pottery manufacturing techniques and methods, but the actual achievements do not highlight a craft that, through its achievements, is important for the spiritual identity or represents a manner in which some members of the community earn their living. Imports belonging to the Velatice-Baierdorf type, with a central-European origin, characterised through a ceramic with thin walls and graphite ornamentation, stand out in this context. The chemical analysis of the composition of the clay from some fragments coming from Băcăinți-*Obreje* had identified a different origin of the clay used for manufacturing the

pottery with very thin walls as compared to the semi-fine ceramic. Similarities between the local ceramic and the artefacts decorated with graphite have been observed in parallel; these aspects identify a local production that includes materials (graphite) coming from other geographical areas.

V. 5. 2. The Gáva culture

The Gáva culture will develop based on a heterogenous background from the beginning of the Late Bronze Age to which are added new infusions of population and implicitly technological ideas; the Gáva culture represents a stable entity in which the craft of pottery will develop itself towards previously unseen manners of expression, with a series of local aspects belonging to a cultural phenomenon extended across a large geographic area.

The ceramic material that we had at our disposal, mostly discovered following research conducted in the fortification from Teleac and Alba Iulia-*Monolit* (*Recea*), has allowed for a detailed presentation of the main shapes and types of decoration, as well as the presentation of the general or particular manufacturing techniques.

It is in this period that the first workshops specialised for this type of production are attested in Transylvania, a situation never before encountered, until now, with regards to this culture. In parallel, the use of vertical-type kilns indicates strong connections with the Mediterranean world; such installations are known in the centre and western Europe only in the Second Iron Age. The ceramic stands out through artefacts with grooved decorations, the masterful execution or some items can be considered a characteristic of specialised potters. From the experimental perspective, we were able to identify the use of remodelled applied slip , in the guise of an organised barbotine in order to obtain the grooves and the secondary firing of the pottery with the help of wet dung in order to obtain biochromatic effects (red on the inside and black on the outside). In parallel, there were experimented methods for fashioning the bi-tronconic vessels with hypertrophied protomes, the “kidney type” cups and the bowls with a pedestal foot, pottery that requires experience and a good dexterity.

Chapter VI

The First Iron Age ceramic

VI. 1. The Basarabi culture

The final stage of the Gáva culture in Transylvania is marked by the Basarabi type elements that enter the area; they will mark the transitions towards the Iron Age and the collection of the museum owns a small, but suggestive, inventory comprising artefacts specific for the manifestations of this culture in central Transylvania. New ornamentation methods are experimented with and the potters reconsider, after a long period of time, ceramic as a support for rendering symbols connected with the spiritual world, distinctly intercalated in the decoration. Although a series of ornamental elements encountered in the patrimony of the Gáva culture are still in use, but the manner of rendereding them is completely different and promotes other types of technical and decorative landmarks. The manner of rendering the impressed and faceted decoration were replicated in experiments; the two are ornamental techniques specific to this culture, identifying a certain degree of specialisation in terms of motricity and specific inventory.

The end of the Basarabi culture, also marked by the initial penetration of Scythian-type elements, is poorly documented but even after only a quick analysis, one can notice a drop in the interest for crafts as far as pottery in concerned.

VI. 2. Scythian-type ceramics

The "Scythian" population will bring with them a ceramic inventory that is limited to a minimum of useful shaped, that are in most cases poorly fashioned. The ceramic collection that belongs to this period, illustrated only through fortuitous discoveries and a necropolis excavated at Alba Iulia-*str. Tolstoi*, substantially enriched through the recent discovery of a large necropolis at Sâncrai (Alba county).

The abundance of the ceramic material deposited as funerary inventory has allows for an important morphological analysis, leading to the identification of general traits that are common but also of some differences in the pottery's manufacturing technology. Traditional gradual modelling techniques in the coiling technique were identified, as well as a certain empirical side in the manufacturing manner. The analysis of the porosity, the texture and the composition of the clay allows the identification of craftsmen trained based on different technological traditions; this is due to the nomad character of this population.

Chapter VII

The ceramic of the Second Iron Age

VII. 1. The Celtic ceramic

The changes following the great Celt migration will lead to major transformations in the manner in which ceramic is produced. In order to analyse the ceramic manufacturing technology from this period, we benefited from the results of a recent discovery from Gâmbaș, substantially increasing the already existing collection, comprised of very valuable artefacts that belonged to the foreign elements. The period is characterised by the appearance of workshops and pottery centres with a permanent character across wide areas; they are characterised by the use of the potter's wheel as an instrument that favours the production of standard ware. The vertical-type kilns become normal accessories for these production centres, covering the need for ceramic across wider or smaller areas. The typology and the size of the pottery start to take on the appearance of a standardised production their main role being utilitarian and the ornamentation being a practice more or less obvious in the general ceramic inventory. The shapes are practical, easy to use, with the thin walls considerably reducing the weight and probably representing one of the "commercial" aspects of the pottery. At the same time, a production that is attributed to the household crafts is perpetuated, and it covers, for various reasons, certain practical, economic needs or are the result of traditional culinary habits. Although the period is marked by the predominance of metal vessels, as a symbol of social status or with a religious role, we find components of the spiritual life transposed also in ceramic; one of the artefacts that is representative for Celtic ceramic art in Transylvania is the *kantharos* from Blandiana, kept in the museum's collection.

VII. 2. The Dacian ceramic

The main source for the Dacian ceramic materials is represented by the excavations conducted at the fortifications from Piatra Craivei and Căpâlna; alongside other artefacts discovered in other contexts, they allow for a larger perspective on the craft of pottery.

The departure of the Celts from Transylvania will lead to a partial continuation of their technologies in the local population. The throwing on the potter's wheel and the adoption of the vertical-type kiln will represent a long-lasting process, never fully assimilated through the transfer of the entire pottery production in specialised workshops. The highpoint of the Dacian

ceramic from the intra-Carpathian area will be favoured by the creation of the power centre in the Orăștie Mountains. The requirements of the elites and the economic advantages lead to the creation of specialised workshops, that produce high quality, „royal" ceramic, most of it exclusively produced for these clients. The period of the Dacian Kingdom is documented also through the discovery or a significant number of workshops and kilns used for firing ceramic; their manner of construction shown both Central-European influences, from the Celtic environment, as well as southern ones, from the Mediterranean area. The appearance of specialised potters is mostly shown by the ceramic thrown on the potter's wheel, partially replacing the manually-shaped one and by the production of „delian" bowls, manufactured by pressing them in moulds. The analysis of the technological markers led to the identification of several manufacturing methods for the fruit bowls, one of the artefacts representative for the Dacian civilisation ceramic inventory. The fashioning techniques with the help of a simple pivot system were experimented with in a practical manner, along the use of ceramic anvil. Attempts were also made with regards to the manufacturing of the jar-vessels and the cups with twisted handles, decorated by polishing.

Chapter VIII

The production of ceramic during the Roman period

The MNUAI's Roman ceramic collection is mostly tributary to the discoveries made in the two urban centres from Apulum.

The conquest of Dacia by the Roman Empire will deeply change the craft of pottery. The newly-conquered province will benefit right from the start from the infusion of goods requested by the military troops and by the colonists. In parallel, the rapid process of colonization will bring with it craftsmen trained in a completely different economic environment, in which pottery is just one of the practical occupations that serve on a pre-industrial scale an entire empire. Even if in some areas the traditional manufacturing manner is maintained (household craft), most of huge ceramic quantity will be transferred in workshops specialised for one or more category of items. Also, the products from the category of fine ceramic, manufactured by specialised workshops become much more accessible, thanks to the new economic and infrastructure facilities (roads, uniformity and political and military stability) and are demanded by the new provincial elite, even though the prices were prohibitive, due to the distance and the intermediaries. These shortcomings, aggravated by the

Empire's economic crisis from the 3rd century AD, will lead to the development of a local production that imitates different imported goods, based on the local resources.

The ceramic production is also attested by a large number of workshops, neighbourhoods for potters and craft centres established at the periphery of urban settlements, of Roman camps or in the rural environment, producing a large variety of items, from those used on a daily bases to vessels that are included in categories that demand special techniques (*terra sigillata*, glazed ceramic, religious vessels, amphorae, dolia). A series of other specialised ceramic items, such as oil lamps and figurines, are manufactured in parallel. An important role is played in this period by the private workshops and particularly by those belonging to the military units producing architectonic ceramic, among them the *officinae* of the XIII Gemina legion camped in the Roman fort from Apulum stand out. Along with these discoveries, a series of mobile inventory pieces specific to pottery workshops are attested, such as moulds for different types of products, kiln spurs, tools for modelling and decorating.

In our endeavour we have focused on the activity of the potters from Apulum and it is in this context that the new discoveries of kilns and pits with waste that prove the existence of two new workshops, were presented. Also, several items of mobile inventory were identified, such as kiln spurs (so far unique in Dacia) and a fragment from a spacer used for firing glazed ceramic.

The utilitarian role of the ceramic and the manner of the manufacturing were taken into account when the ceramic was analysed and the chapter was structured for each artefact category, starting with the La Tène ceramic, the commons vessels, the pottery with special functions (amphorae, dolia, religious vessels). Two subchapters are dedicated to the *terra sigillata* and the glazed ceramic manufacturing techniques, with both locally produced and imported artefacts being discussed. When discussing the pieces covered with a vitreous layer, the materials discovered at Ampelum in the kilns of the workshop led by Gaius Iulius Proclus were also presented.

The practical experiments were less used for confirming manufacturing techniques, because of the lack of the dexterity needed to throw pots on the potter's wheel, fashioning only some stamps through different methods and creating moulds for the *terra sigillata* pottery.

The production of oil lamps and ceramic figurines is illustrated by a significant number of artefacts and the two subchapters document the main types and manufacturing techniques as identified through technological markers. The pressing in mould technique has allowed us to conduct numerous experiments confirming the mobility and the possibilities for diversifying the inventory through different methods of copying and adaptation.

The last subchapter is dedicated to the architectonic ceramic and details the main manufactured items and the manufacturing techniques; the experiments focused on recreating the technology for manufacturing ceramic *tesserae*. Archaeometric investigations focusing on the ceramic density were also conducted; quality differences in the production of military workshops and civilian ones were identified.

Conclusions

Several stages of progress can be distinguished in the history of the craft of pottery in this part of Transylvania, interrupted by the arrival of alien elements so that, afterwards, following the creation of a stable environment, we are witnessing a new evolution, however most of the times based on other technological principles.

The slow progress from the Neolithic period is followed by more and more rapid changes following the demographic growth and the creation of several areas where different modelling and ornamentation techniques are experimented. The external influences contribute to enriching the cultural background, that sometimes is also expressed through ceramics. Some of the principles and technological methods developed in a geographical area and time period can disappear completely or persist based on the social and cultural modifications in relation with the neighbouring areas or further away from the influence.

The ceramic manufacturing technique from a certain period can be connected with modifications that happened in the characteristics of the morphological and decorative style, the inventory and the technological approach methods reflect their own background and the manner in which the information and examples from outside environments are accepted and adapted.

The definition of the technological manufacturing subtleties through a cross-disciplinary approach offers a much larger perspective on the manner in which different communities have interacted; the craftmanship traditions can identify social entities or their particular aspects. In this context, the paleo-technological experiments allow the evaluation of parameters that are impossible to be determined through the direct analysis of artefacts, such as: the cognitive processes for acquiring techniques, the time involved in the artefact, the motivations that lead to maintaining or perfecting certain types of recipients.