Arts and Design Studies
ISSN 2224-6061 (Paper) ISSN 2225-059X (Online)
Vol.15, 2013

Traditional Pottery Raw Material Formulation: The Theoretical Basis of Practice

Chris Echeta (Ph.D)

Department of Visual and Creative Arts, Federal University Lafia, P.M.B. 146, Lafia, Nasarawa State, Nigeria.

*E- mail of corresponding author: echetachris@yahoo.com

Abstract

From time immemorial, pottery, which has been the preserve of women in most African cultures, has sustained the arm of local and household economy in Africa. Long before the idea of MDG sprouted, this indefatigable sorority has organized and supported its craft and even financed it within the context of its social milieu. To be able to further empower them and bring into their trade a sense of newness, it becomes compulsively expedient to understand the theoretical background behind what they do and the grounds they have covered. As profit is the basic incentive for business, the question of economic benefits for these women ought to be a central streak of any intervention. The traditional pottery practice is a simple one rooted in the apprenticeship system which is handed down from one generation to the next. With the exception of a few cultures where men also practice it, pottery is an affair for women. Ignorant of the academic theory of their practice, traditional potters start from the entry point of body preparation to prepare for the exit point of pots' thermal firing and survival. Since firing must be administered to the wares, if they must make a utility sense, it becomes inevitable to make such early pre-emptive preparations to ensure no or limited firing casualty rate. This paper looks at; 1). The theory of multi-coloration in secondary clays and its linkage with body preparation and adjustment for effective potting, and 2).To interpret the theory by the engagement of visual images which simplify comprehension.

Key Words: Pottery; Firing; Traditional Potter; Multi-coloration; Apprenticeship; Raw material; Grog.

1. Introduction

The capacity of the African traditional potter to mass-produce her pots through 'personal touch' programme remains a production mystery. She seems to be drawing from an inexhaustible stockpile of patience whose elasticity is endless. Thoughtfully batting her eyelids, she pinches her clay, considers it, and puts it in place on the pot wall.

For the traditional master-potters and generations of their apprentices, the mainline objectives of the Millennium Development Goals, (MDGs) were only formalized in the year 2000 by the United Nations. Predating this formalization by a wide time margin, is the apprenticeship system of traditional pottery which the local ancestors of pottery have sustainably pursued with diligence. They laid down the foundation for sustainable poverty reduction, employment generation, wealth creation. According to Ogunduyile in (Uche Nnadozie 2012), this is what NEPAD (New Partnership for Africa's Development) seeks to achieve.

In a bid to impart some utility value, she takes time to diligently prepare her clay body, getting it ready for the fire test the survival of which justifies all the production struggle. This paper has taken time to trace and explain the 'hidden' theory of the traditional clay body preparation and adjustments by nature and by the potters themselves.

2. Clay and its Natural Presentation

> Clay is a general term including many combinations of one or more clay minerals with traces of metal oxides and organic matter…. Primary clays, also known as kaolins, are located at the site of formation. Secondary clay deposits have been moved by erosion and water from their primary location. (Wikipedia-free encyclopedia)

"The invention of pottery is a highly significant phenomenon in human history", (www.metafro.be). Also from the same source, "The emergence of pottery in a culture has been linked with important changes in lifestyle…". In *Criticism: An Artist's Perspective*, (Adam Welch 2011) says that "culture, the development of society and its institutions, shapes our behaviour and the understanding of the world. It is the opposite of nature, yet not necessarily anti-nature".

The interaction of the traditional potter and her environment through clay endorses the above and exhibits a networking of a symbiotic range of survival strategies that remain fair to the trio—the potter, the society and her environment. Palmer agrees with the above when he writes, "From its origins, the making of pottery has reflected the development of mankind's relationship to nature…" (Palmer 2007).

Most deposits from where the traditional potters win their clays are secondary clay deposits and are plastic enough for form generation while others are not so plastic. The plastic sites yield 'formable' clays which are known as natural bodies. Rhodes (1973:24) defines a clay body as "a mixture of clays or clays and other earthy mineral substances which are blended to achieve a specific ceramic purpose".

Beyond the knowledge of their practical experience lies the theory of their natural clay body. Most of the secondary clay deposits from where the potters dig are variegated in colour. These colours, which the traditional potters do not worry about, may include browns, (of various shades), grays, yellows and so on, present themselves easily to the investigator. The implication of this is that these individual clay units, as presented by their colours, arrived at the site from different terrains, perhaps, millions of years before their discovery. Their colours give them away as to the colour of the terrain over which they passed on their way to their tentative destination. It is also unlikely that they all arrived at the same time and from the same distance no wonder there are different strata which signify the waves of arrival.

Clay formation and movement are brought about and empowered by the forces of geologic weathering. Between the point of formation and the new site where they are deposited, grinding and the sorting out of particle sizes take place. All things being equal, the particle sizes of all the clays which move away from their primary sites to equal distances away ought to be equal. This does not follow in practical terms. Clays that have travelled over rocky of stony terrains are likely to be more finely ground than those whose passage have been through smooth areas, even when the distances of movement are equal. From the above line of thought, one clay deposit from where the potters win their clay is likely to be made of clays with a variety of particle sizes and colours. Rhodes, (1973:5), argues that the present clay deposits are likely to have been turned over and re-deposited by a continuous, but sometimes, imperceptible maw of geologic forces. By implication, the present day deposits from where today's potters harvest their clay may have had a double or even triple movement experiences before finding the potters' hands. It is in the midst of this tangle of 'departures' and 'arrivals', particulate differentials and colour variegations that the traditional potter locates her fate and gallantly subdues it in a process known as body preparation and raw material adjustment.

2.1 Raw Material Adjustment

Even though nature has furnished them with inexhaustible levels of raw materials, the potters do not take it for granted. From practical experience, they know that without further clay adjustments, a lot of their wares will be lost to firing. Every potter's desire and expectation is that her firings come out one hundred per cent successful. However, because of the fallibility of even the expert potter, it has never been possible to always achieve and sustain that level of success.

Products from fire are usually graded under three main categories—grades one, two and three. The first are the most highly priced, usually without blemishes. The second are not broken, but comes with less aesthetic quality which still leaves them 'sellable', while the third are those which may have exploded in the fire or sustained serious cracks. These unmarketable ones are not thrown away or discarded because they provide the much-

needed body adjuster known as grog. The level of grog generation is usually inversely proportional to the expertise level of the potters. In other words, learner-potters generate more broken pieces which will be used as grog than expert and more experienced potters.

Grog, which is crushed biscuit, facilitates trouble-free moisture loss by opening up channels for its traffic, either at the wet stage or during the water-smoking period as a prelude to firing. Having been fired once, grog does not shrink anymore when mixed into clay. This is however a generalized statement which depends on the initial temperature to which the grog was fired. Not only does it perform the above functions, grog provides 'tooth' as a structural anchor for effective load-bearing during the making process.

The introduction of this grog into clay batches, for the traditional potters, has always been without the benefit of formal education. The sustenance of this knowledge is a part of the apprenticeship system which has survived through the ages. Unlike the modern potter or ceramist, the local potter does not have to measure out and weigh the material before mixing it into a given mass or batch of clay. She is always aware of the technical allowances which grog introduction can permit during firing. This awareness becomes the compass which directs the quantity to be added at any given time. One of the mysteries of local pottery is that, for the expert potters, their grog quantities are always about the same even though they work independently. This 'coincidence', so to call it. is based on practice and experience and provides a picture of a string of unwritten technical laws which bind production procedures.

This grogging issue is at parallel with the raku body which is also profusely charged with the same ingredient to answer to the demand of sudden temperature shock. Raku tradition was developed in 16th century Japan as a low-fire form of pottery. (Cosantino, 2002:65).

2. 2 In Search of a Working Batch

The physical mixture of clay and grog is mostly done by 'foot action' at the traditional level. A semi-solid mass of slaked clay is discharged on a cleaned and swept ground space and measures of crushed grog sprinkled on top of it. Bare-footed, these potters step into this clay, marching and mashing them together in a consistent up-and-down fashion. This is alternated with further sprinkling of another batch of grog and water as the batch gets harder. This alternation continues until they are satisfied that enough grog has been introduced. Apart from the facilities which grog provides, as mentioned above, it also provides multiples of platforms on which the potters' feet grind down the large particles to finer grades thereby elevating the plasticity status of the clay and also dealing with the particulate differential problem.

Figure 1. Foot action in clay/grog mixing

Beyond the mixing of clay and grog lies the need to mill the mixture into a homogenous mass. The foot action then continues to achieve this objective, thereby dealing with the variegated colour issue. What the pugmill does for the modern potter is what foot action does for the traditional potter. She takes all the stressful actions at the clay preparation stage in good faith. This is because she is overtly aware of the consequences of doing otherwise at the firing end of production line—breakages. The introduction of grog into the clay mass, no matter the good it may serve, deplasticizes the clay and makes it less workable. The theory of it all is that grog, a non-plastic material, alters the balance of elasticity, thereby tipping the equilibrium more to the non-plastic end. The silent technology of foot-work not only homogenizes the mix but also restores the elasticity equilibrium initially lost. The restoration formula is unwritten but the testimony of this unwritten pathway is what endorses the skill of pot-making.

To further illustrate the theory of relationship between foot-working and plasticity, the granular amplification of the grog will come into play. The percentage magnification of these grog particles gives away their irregular forms and shapes. Like local millstones, they present grinding and milling surfaces and with the foot playing the role of the hand-piece of the grinding facility, crushes and continues to mill and mix the materials. The potters sense the mixture and know when to stop and they do not stop ever get it right.

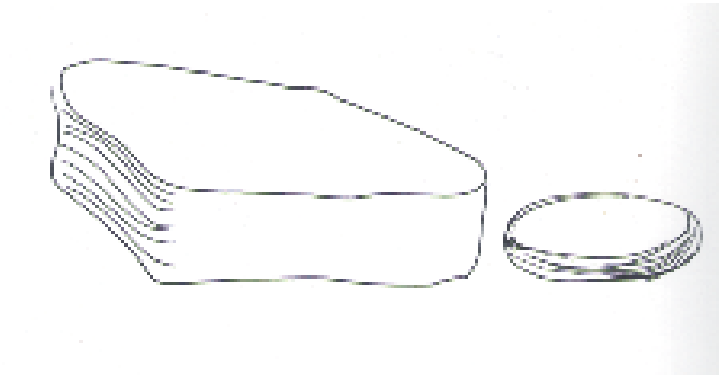

Figure. 2. A typical grinding stone and the hand piece. (Artist's impression by the author).

potters sense the mixture and know when to stop and they do not ever get it wrong. This in-built sensor is a part of the attitude of pottery production whose accuracy hinges on pot-making experience over time.

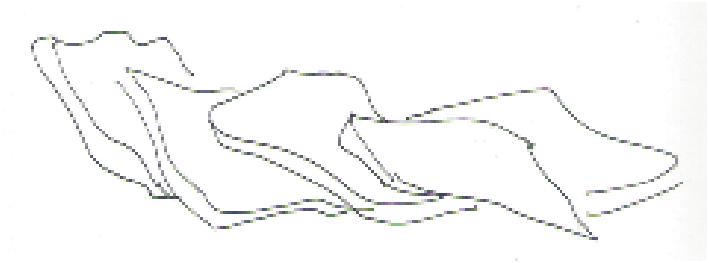

Figure. 3. Amplified grog particles and their surfaces, the venue of foot grinding. (Artist's impression by the author).

The larger the clay particles , the less plastic that clay becomes. In order words, the size of clay particles is generally inversely proportional to the plasticity exhibited by that clay. And the smaller particles generated as a result of foot action have more inter-particulate contacts within the clay mass itself thereby establishing firmer grip on each other—which is one of the bases for enhanced plasticity.

Figure. 4. Large clay particles surrounded by a film of moisture.

Another reason for upgraded plasticity status is on the moisture environment of the particles. When slaked clay is being worked upon with the foot. The mass keeps stiffening with the progressive sprinkling or introduction of dry grog. This increasing stiffness calls for the introduction of moisture in form of water sprinkling which the potters respond to. The implication is that each particle of clay, no matter how tiny becomes enveloped by a film of moisture which enhances the easy sliding and gliding of the clay particle plates against each other. This increases the inter-plate mobility and induces particulate grip making the clay more malleable and, as a result, more worka

Figure 5. Tiny clay particles surrounded by films of moisture increasing sliding and plastic status of clay mass.

3.0 Plasticity as a Facility for Bone-dry Strength

The compressive and tensile strength of unfired dry ceramic vessels expressed as load-bearing capacity is known as bone-dry strength. This strength enables the vessels to be stacked or piled up in a heap without breaking or cracking. The stacks may be up to between five and ten feet high. This stacking method is a facility that is based on high bone-dry strength employed in the traditional open hearth firing. The traditional master potters and their apprentices do not bother about the scientific theoretical bases of bone-dry strengths. They are insulated from that knowledge by the lack of formal education along that line. Yet, no disadvantage is suffered in their technique of pottery manufacture. All the theories are swallowed up in the strides of long-standing experience garnered as generations roll over to the next along the stream of time. The theory behind the bone-dry strengths at various levels is rooted in clay particle sizes. When particle sizes are large, bone-dry strengths are expected to diminish and the other way round. In other words, the two are inversely proportional to each other. This theoretical truth is illustrated below.

Figure 6. Large clay particles and few areas of contact (grip) marked by short strokes resulting sin fragile bonding

.

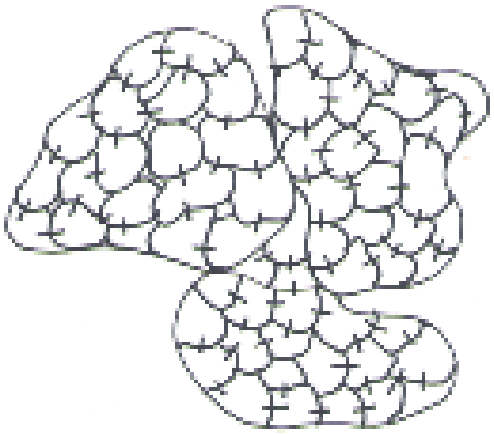

Figure 7. Small clay particles and innumerable multiples of contacts points—stronger bonding.

4. Conclusion

The dormant clays that sit in deposits are unmindful of the theoretical interpretations and use of their potentials, neither are they concerned about the digital data on their physical and chemical characteristics. Not only is humanity burdened by the above, need also abound about how this mysterious raw material can be harnessed for the benefit of those who sojourn on top of the deposits.

As knowledge seekers and researchers investigate the environment and acquire more thirst to expand the boundaries of information, they rely on the need to find out and discover why many things behave and react the way they do. The traditional pottery has presented itself for the above purpose. Here , this spreadsheet has interpreted some of the theoretical bases upon which clay, as mainline pottery raw material, is formed based on colour, preparation, particle size and plasticity as well as how plasticity is related to load-bearing capacity at bone-dry stage. While dealing with secondary clays mainly, this write-up has also summarized the place of grog in body preparation, providing grinding surfaces for particle size degradation through footwork and improved moisture mobility for trouble-free drying. This has provided a compendium of knowledge from where more research is expected.

References

Adams, Welch. (2011). "Criticism: An Artist's Perspective" *Ceramics: Art & Perception*, Sheridan: Ceramic Art. Issue 84, pp. 74-75.

Cosantino, P. (2002), *The Encyclopedia of Pottery Techniques: A Comprehensive Visual Guide to Traditional and Contemporary Techniques;* New York: Sterling Publishing Co,. Inc.

Definition and grouping of clay. Wikipedia-free encyclopedia. (Retrieved 6 April, 2013: 1: 23 am).

Nnadozie, Uche. (2012). "Creativity and the Millennium Development Goals (MDGs): An Appraisal of the Visual Arts in Nigeria", *Fireworks for a Lighting Aesthetician*. Sunday Enessi Ododo (ed). Lagos: CEBAAC. pp, 338-347.

Palmer, D. (2007), "City and Countryside, History and the Potter's Art", *Ceramic Technical*. Paddington: Ceramic Technical. No. 25, 12-17.

Rhodes, D. (1973: 5), *Clay and Glazes for the Potter*. Pennsylvania: Chilton Book Company Limited.

Rhodes, D. (1973:24), *Clay and Glazes for the Potter*. Pennsylvania: Chilton Book Company Limited.

www.metafro.be, (Retrieved 6 April, 2013. 5 am).

Chris Echeta is currently a Senior Lecturer at the Federal University, Lafia, Nasarawa State of Nigeria; was born on September 9 1953 in the historic town of Igbo-Ukwu in Anambra State, Nigeria. He graduated from the University of Nigeria, Nsukka in 1979 with B.A. (Hons)—majored in ceramics and M.F.A.—2001 (specializing in ceramics). His Ph.D was in Art History from the same University, (2011). Has published many academic articles in various journals. Member of professional bodies and a Biographee of the Smithsonian Institution.

Sent to (IISTE—Research on Humanities and Social Sciences). RHSS@iiste.org