

# THE ORIGINS AND USE OF THE POTTER'S WHEEL IN ANCIENT EGYPT

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*To the memory of Amanda, who always thought that even the smallest achievements should be properly recorded.*

*Also to the memory of my cousin Ellen Doherty, taken from our family too soon and who shared my deep love of Africa.*



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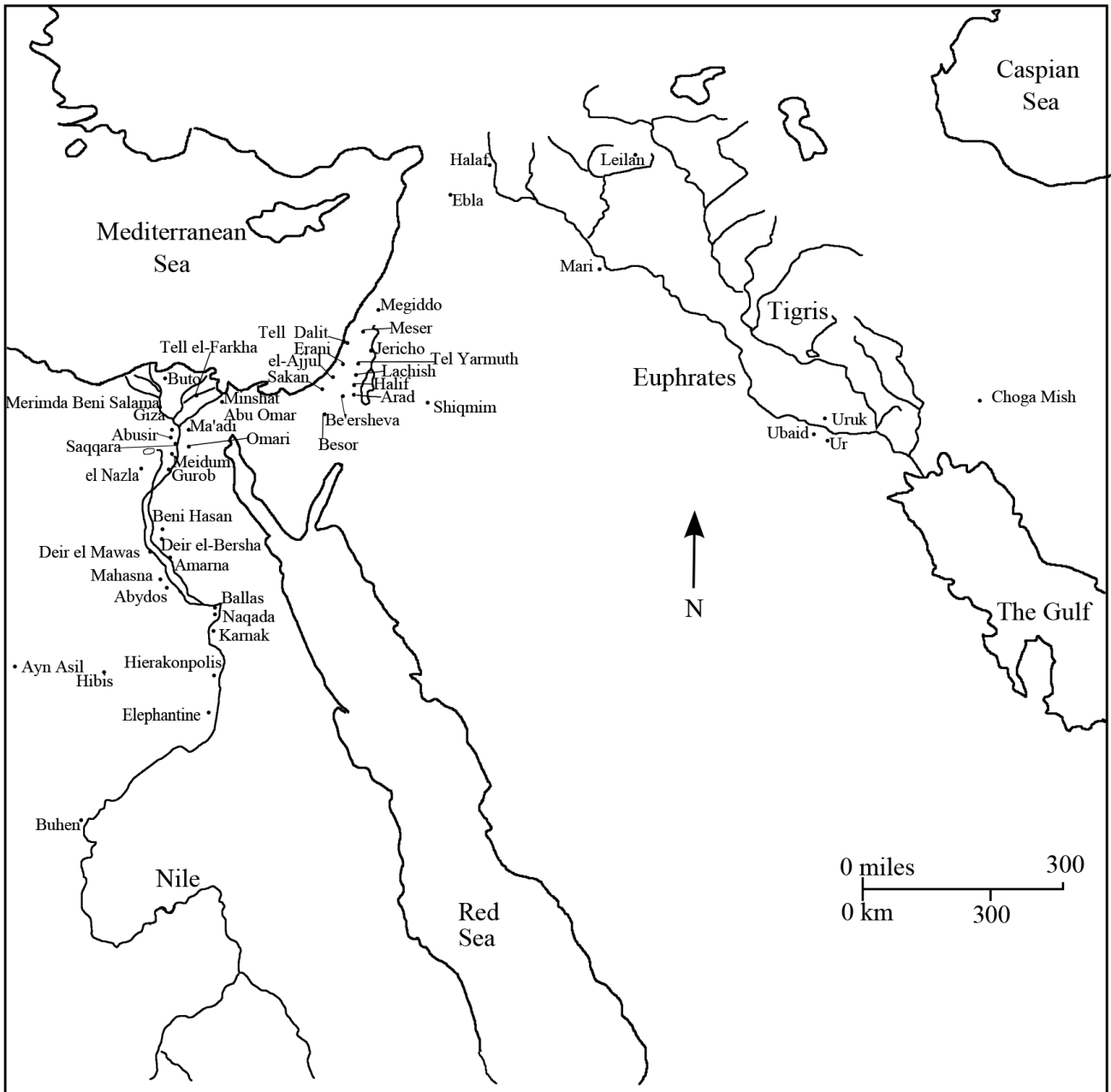
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MAP OF THE NEAR EAST AND EGYPT, SHOWING KEYS SITES MENTIONED IN THE TEXT. S. DOHERTY

Cal. BC	Petrie's Phases (Petrie 1901, p. 4-12)	Petrie's Sequence Dates	Period-Lower Egypt (Hassan, 1985, pp. 95-6, fig 2)	Period-Upper Egypt (Kaiser, 1957, pp. 67-77)	Period (Hendrickx (1996, pp. 63-64)	Key Kings	Dynasties	Near East Terms (Dessel & Joffe, 2000, p. 38)
c.1550-1069	New Kingdom		New Kingdom	New Kingdom	New Kingdom	Seti I Rameses II	18-20	LATE BRONZE AGE 1550 - 1200 BC
c.1700-1550	Second Intermediate Period		Second Intermediate Period	Second Intermediate Period	Second Intermediate Period	Hyksos in Delta Pharaohs ruled Thebes	13-17	MIDDLE BRONZE AGE IIB/C (1750-1500 BC)
c.2025-1700	Middle Kingdom		Middle Kingdom	Middle Kingdom	Middle Kingdom	Amenemhat III Nimaatre	10-12	MIDDLE BRONZE AGE IIA (2000-1750 BC)
c.2181-2025	First Intermediate Period		First Intermediate Period	First Intermediate Period	First Intermediate Period	Neferirkare	7-10 (11th also in south)	MIDDLE BRONZE AGE I (2100-2000 BC) EARLY BRONZE AGE IV (2100 BC)
c. 2686-2181	Old Kingdom		Old Kingdom	Old Kingdom	Old Kingdom	Sneferu, Khufu, Niuserre, Unas, Pepi I & II	3-6	EARLY BRONZE AGE III/EARLY DYNASTIC II c.2750 BC EARLY DYNASTIC III c.2600
c. 2900		75-82			Naqada IIID	Semerkhet/Qa'a	2	EARLY DYNASTIC/ EARLY BRONZE AGE II
c. 3000-2900		75-82		Naqada III c3	Naqada IIIC2	Djed-Adjib	2	URUK/PROTOLITERATE/ EB II
c. 3100-3000	Semitean (until 3050 Cal. BC)	63-76		Naqada III c1-2	Naqada IIIC1	Narmer-Djer	1	URUK/PROTOLITERATE EARLY BRONZE AGE II
c. 3300-3100	Semitean	63-76		Naqada III a1-IIIb2	Naqada IIIA1-IIIb	Scorpion I-Iri-Hor/Ka	0	URUK/PROTOLITERATE EARLY BRONZE AGE I
c. 3650- 3300	Gerzean	38-62	Buto (c-d) Ma'adi (a-b)	Naqada IIc-IIIa1	Naqada IIC-IID2			UBAID CHALCOLITHIC 4000-3000 BC
c. 3900-3650	Amratian	31-37	Ma'adi	Naqada Ia-Ib	Naqada IA-IIB			UBAID- c5000-3500 BC
c. 5200-3900	Badarian		Faiyum Neolithic 5200-4000 BC	Badarian c.4400-3900 BC	Badarian			UBAID c 5000-3500 BC

CHRONOLOGY. DATES UNCERTAIN PRIOR TO 664 B.C.



# Chapter 1:

## Introduction

Despite many years work by scholars on the technology of pottery production, it is perhaps surprising that the origins of the potter's wheel in Egypt has yet to be determined. This present project seeks to rectify this situation by (1) determining when the potter's wheel was introduced into Egypt, (2) establishing in what contexts wheel-made pottery occurs, and (3) considering the reasons why the Egyptians introduced the wheel when a well-established hand-made pottery industry already existed. To date, research has tended to focus on the decoration and function of the pot rather than on the manufacturing methods used. In the early part of the twentieth century, mention of the potter's wheel was often a brief comment indicating that the wheel seemed to be in use rather than discussion on how it came to be used as a technology or how the use of the wheel was reflected on the pottery (Reisner, 1923; Petrie, 1925, p. 57).

The reasons why the potter's wheel came to Egypt have not yet been sufficiently discussed, nor has the first use of the wheel in Egypt been completely ascertained, yet the potter's wheel is arguably the most significant machine introduced into Egypt during the Old Kingdom, second only perhaps to the lever. Most ancient inventions were inspired by shapes noted in the natural world. Wheels do not exist in nature, and so can be viewed entirely as a human-inspired invention. The impact of this innovation would not just have affected the Egyptian potters themselves through the learning of a new skill but it also signalled the beginnings of a more complex and technologically advanced nation. The links between the potter's wheel and the rise of elite-sponsored specialisation have not yet been examined. It is through a thorough analysis of all available sources, such as manufacturing marks on pottery, provenanced potter's wheels, and depictions of potters in art and text that the origins of the potter's wheel can begin to be understood. Through examining manufacturing marks on pottery and determining which are characteristic of wheel-made wares by comparing these marks with experimental examples, it is hoped that a more complete view can be gained about when and in what manner the Egyptians were manufacturing their pottery vessels on the wheel.

There are terminological problems amongst the literature relating to the potter's wheel. Scholars are uncertain whether the wheel bearings discovered on excavation sites or depicted on tomb walls should be termed a turntable or a potter's wheel. There is also uncertainty about whether these bearings were actually capable of producing thrown pottery or were instead being used as an aid for rotating a vessel during handbuilding. As a result, a variety of terms exist and researchers (Arnold, 1993, pp. 41-3; Edwards &

Jacobs, 1986, pp. 55-6; Rieth, 1960, p. 20) do not seem to agree on whether these bearings should be termed potter's wheel, fast simple (low) wheel (Holthoer, 1977, p. 31), low wheel, slow (simple) wheel (Rice, 1987, pp. 132-4), potter's stand, turntable (Edwards & Jacobs 1986, pp. 55-56; 1987), *Töpferscheibe* (Arnold, 1976; Faltings, 1989, p. 137), *tour*, *ournage* or *ournette* (Childe 1954, pp. 196-197; Soukiassian *et al.* 1990). In addition, one of the major debates regarding the use of the potter's wheel focuses on whether a centrifugal force<sup>1</sup> of sufficient rotations per minute (r.p.m.) can be achieved to throw a pot c.50-150 r.p.m. (Rye, 1981, p. 74)<sup>1</sup> or whether it could be achieved at lower speeds contra to Edwards and Jacobs (1986, pp. 55-56; 1987).

Another debate concerns whether vessels were in fact "rotated"<sup>2</sup> on the "wheel" as part of the finishing process, with the resulting concentric rings or rilling marks created by "Rotative Kinetic Energy" or whether this "RKE" made the vessel appear as though it was thrown (Roux, 2003, p. 23; Roux & de Miroschedji, 2009). Dorothea Arnold (1993, p. 42) notes that the term "turning" is sometimes applied to pots that have been slowly rotated on a slow (hand-spun) wheel, and suggests that a better term to use would be "rotational assisted device" or turntable. The use of the terms concentric rings and rilling are equally applied to a pot that has been rotated or thrown, or a combination of the two, and this can often lead to confusion. Some pots are described as "partially rotated" implying that only a particular section of the vessel was formed on a wheel, often the rim of the vessel (Arnold, 1993, p. 36; Wodzińska, 2009c, p. 25) or "wheel shaped" (Roux 2003, p. 3) meaning that the wheel was used to thin down or shape already roughly coiled vessels. These terminology problems will be further addressed in Chapter 2 and in experiments in Chapter 6.

The scope of Chapters 2 and 3 is to review the known evidence relating to when the potter's wheel was first utilised in ancient Egypt. The archaeological literature will be consulted to determine the present state of knowledge, and with any problems, terminological contradictions, errors, or misnomers highlighted for further examination

<sup>1</sup> Not to be confused with the term centripetal force. Centripetal force, from the Latin for "centre seeking" is a centre seeking force through which the force is always directed toward the centre of the circle. Without this force, an object will simply continue moving in a straight-line motion. By contrast, centrifugal force, from the Latin for "central fleeing," relates to moving or direction outward from the centre, this is the opposite of centripetal force. Centrifugal force is occurring within the clay when the potter's wheel is spun sufficiently fast, the clay is directed outward from the centre of the wheel.

<sup>2</sup> Archaeologists (e.g. Arnold 1993) sometimes use the misnomer "turned" to signify rotated, whereas potters use the term to indicate the scraping or shaving off any excess clay.

later in this thesis. Chapter 2 will guide the reader through many of the known excavated potters' wheels, whether provenanced or not, in the Near East and Egypt. In Chapter 3, an analysis of the known tomb art depicting potter's wheels and workshops, tomb models of workshops and limestone statuettes in Egypt only, as research to date has not revealed relevant tomb art from the Near East will be undertaken. Finally, Chapter 3 will describe the known ancient textual and written sources relating to potters to provide a broad overview of all possible sources before they can be thoroughly analysed.

Chapter 4 will consider whether the potter's wheel was used differently in Egypt than in other areas of the Old World. It is suggested that potters in the Near East did not initially utilise the potter's wheel for throwing vessels, whereas the Egyptians did. By understanding how the pottery industries developed within the Ancient Near East and Egypt it is hoped that the underlying social and economic structures can be understood. If both areas had similar pottery industries based upon workshops, kilns and wheel production run by specialist potters perhaps being instigated or organised through elite-sponsorship, then it is likely that the two pottery industries developed from the same model. Inventions such as the potter's wheel may have been transferred to Egypt from Near Eastern centres in a form of elite technological exchanges from one court to another as part of diplomatic relations. Evidence for such exchanges has been well documented in terms of art styles, foreign pottery influences (Faltings, 1998a, 1998b; Von der Way, 1992), foreign imports (Oren & Yekutieli, 1992, pp. 361-384) and the Egyptian colonisation of Canaan (Brandl, 1992, pp. 441-448).

The Egyptian hierarchical structuring of Dynastic times is thought to have been quite rigid and controlling of the lower status members of society (Shaw, 2004, pp. 12-24) but is this reflected upon the status of Egyptian potters? The status of the potter will be determined through study of the representation of potters in art e.g. tomb wall scenes, textual evidence such as the *Satire of the Trades*,<sup>3</sup> archaeological remains such as pottery workshop sites, and comparisons with modern ethnographic studies of potters. Any change in the status of potters could be related to broader socio-political changes within the Egyptian state, and could be a wider ranging phenomenon occurring concurrently in contemporary societies in the Near East. Through extensive reading of technological theory and gender theory and applying this to the Egyptian model, it is hoped to trace the development of the invention of the potter's wheel to the production of pottery using the potter's wheel. Pottery made by hand is often thought to be the realm of women, but when the wheel begins to be used, men tend to be the main potters (Vincentelli, 2003). Through the application of gender theory and ethnographic study the role of Egyptian men and women in pottery production will be assessed in Chapter 4.

<sup>3</sup> The *Satire of the Trades* claims the potter "is muddier with clay than swine to burn under his earth," *Sallier Papyrus* II, Column V, line 5 (Parkinson, 1999, pp. 273-83) e.g. BM10182.

The stone wheel bearings which form the main moving component of the potter's wheel were usually made of basalt or granite (see Table 2.2, Chapter 2; Hope, 1981; Powell, 1995), two of the hardest stones to quarry, hew, hone (7 on the Mohs scale, Tabor, 1954, p. 251) and procure as they are often sourced in far-flung, hazardous locations. Therefore, quarrying expeditions would require much elite-instigated forethought and organisation (Harell & Brown, 1995; Klemm & Klemm, 1993; Mallory-Greenough, Greenough, & Owen, 1999). Chapter 4 will assess the significance of the use of basalt and granite, which during the Old Kingdom were normally restricted to the production of elite royal funerary items such as vases (Mallory-Greenough *et al.* 1999), mortuary pyramid temple floors (Hoffmeir 1993, p. 117; Mallory-Greenough *et al.* 2000) boundary or tomb marking *stelae*<sup>4</sup> (Bard 2000, p. 70; Wilkinson 2001, pp. 80-81), sarcophagi and statues (Stocks 2003). The use of basalt for both elite equipment and potter's wheel bearings could signify wider changes within the fabric of Egyptian society, beyond the creating of pottery, such as who was determining the use of the potter's wheel in the first place and why it came to be invented or introduced at all. The use of the potter's wheel could have represented a form of control by newly established elite classes, perhaps demonstrating their power and perhaps dominion over others. It could perhaps signify close technological links to foreign nations such as Canaan, Palestine and Mesopotamia, and such links between these ancient societies will be examined in Chapter 4.

Chapter 5 will investigate how the potter's wheel might have come to Egypt. It is commonly assumed that the potter's wheel was not invented in Egypt but in the Near East (Kuhrt 1995, p. 22; Freestone and Gaimster 1997 p. 15). Consequently, this chapter will assess if this was the case and if so, why. Through examination of technological and economic theory and the uptake of innovations such as the potter's wheel, it is hoped to better understand why the Egyptians introduced the potter's wheel at all. Arguably, the Egyptians had been successful in creating far superior pottery by hand (even relatively coarse wares) for centuries before the introduction of the potter's wheel (e.g. coil-made Black topped Badarian wares of Naqada I-II A/B (Petrie & Quibell, 1896, pp. 12, pl xviii-xxi; Petrie & Mace, 1901, pp. 13, pl xiii; Sowada, 1999, pp. 85-6)). In contrast, the use of the potter's wheel usually denoted a deterioration in the decoration and beauty of the pottery in favour of rather plain, utilitarian-style pots (Freestone & Gaimster, 1997, p. 15).

Chapter 5 will try to make sense of this rather odd trend away from decoration and will investigate if there are other underlying political reasons for such a change in technology. It is proposed that the reason for the invention of the potter's wheel was not to mass-produce utilitarian wares, but rather to create specialised vessels made on a

<sup>4</sup> *Stelae* or *stele*, from Latin "to stand" is the term Egyptologists use to refer to an upright stone slab or pillar bearing an inscription or design and serving as a monument or marker.



specialist piece of machinery. Using selected case studies, it is proposed in Chapter 5, to consider the arguments for the mass-production of pottery vessels and ascertain where the first wheel thrown pottery was located. The changing traditions of styles and forms of shaping pottery will be studied with the view to determining the extent to which the potter had a choice in their methods of shaping pottery, or whether this was controlled by the elite state officials.

Chapter 6 will examine pottery of the early Old Kingdom (c.2686-2181 B.C.) to ascertain when the potter's wheel was in use, what pottery types the potters were creating with their wheels and in what contexts they occurred. Once possible wheel thrown pottery has been identified through examination of museum pieces, Chapter 6 will consider to what extent the use of the potter's wheel can be noted on pottery. Through practical experimentation by manufacturing replica pottery using a reconstructed potter's wheel based on pictorial, literary, ethnographic work and excavated potter's wheel bearings, as outlined in Chapters 2 and 3, it will be possible to deconstruct the manufacturing methods used by the Egyptians to create wheel thrown pottery. From these experiments, a greater understanding will be gained of how to determine what manufacturing processes were involved in the excavated pottery assemblages. A fresh perspective will therefore be achieved for analysing and examining wheel thrown pottery and a greater understanding as to why the potter's wheel was developed as an invention.

By undertaking experiments in understanding the techniques of throwing on the potter's wheel, the aim is to resolve the terminological problem of what constitutes a vessel thrown on a hand-spun potter's wheel when compared with a vessel that has been formed by coiling. The methodology employed for the experiments will involve firstly creating coil and wheel thrown pots, so as to enable the author to identify the macroscopic details indicative of manufacture. The resulting pots will be photographed and X-rayed to provide further insights of manufacture. The methods will be filmed and photographed in order to deconstruct the gestures and movements made during manufacture and ascertain whether the techniques used could be associated with particular manufacturing marks produced on the pots. This criterion of manufacturing marks would then be compared to archaeological pottery collections in museums to identify potentially wheel thrown pottery using the characteristics of wheel throwing and coil-building which had been identified in Experiment 1. Experiment 2 will then involve the replication of a known potter's wheel in the British Museum collection, employing it for throwing selected vessels and testing the results by comparing the macroscopic features.

Given that it is likely that the potter's wheel was instigated through elite sponsorship (as postulated in Chapter 5),

in Chapter 7 the contextual evidence of the vessels will be assessed to establish how the potter's wheel was used to create pottery. If the potter's wheel was used to create vessels for the elites, it is likely that wheel thrown vessels would only occur in elite contexts, such as in ritual or funerary offerings. In Chapter 6, the pottery of the early Old Kingdom will be examined to ascertain when the potter's wheel was in use, what pottery types the potters were creating with their wheel, and in what contexts they occurred. Early wheel thrown vessels occurred in similar cultic and funerary contexts in Levant and Mesopotamia (Courty & Roux, 1995) and it appears that the Egyptians adopted this new technology to produce items in similar contexts (funerary and cultic) but in an Egyptian manner. Social and economic literature and technological theory relating to the uptake of this new technology will be assessed and the reasons behind the use of the potter's wheel analysed. The Egyptians seemed to utilise this new technology to produce their own version of miniature vessels previously made in stone. The traditional methods of hand-building pottery vessels were successful in producing pottery items of high quality on a large scale for the domestic market, so it would seem that the potter's wheel was a rather redundant invention. It is anticipated that by investigation of the location of pottery production, whether in an industrial workshop or domestic area, and by considering how it was being made (wheel or hand, or partially by hand and finished off on the wheel) and how it was being fired (open or so-called 'bonfire firing' or enclosed updraught kiln), that this will indicate whether the use of the wheel was inspired by elite sponsorship. The use of basalt for the potter's wheel bearings also appears to be significant, given that it was usually restricted to royal building materials and items such as statuary, temple floors and sarcophagi.

By examining theories of innovation, technology and technical systems in conjunction with ethnographic research and analysis of the manufacturing marks of selected Egyptian pots from various sites and sources, it is hoped to identify the origins and use of the potter's wheel in Egypt. It is conjectured that the potter's wheel was adopted from Mesopotamia and the Levant regions and this research will address when this occurred, attempt to understand how this transition took place, and consider the underlying processes and effects, to ascertain why these might be significant. Through analysis of manufacturing marks on pots, it is planned to deconstruct the various manufacturing techniques that the Egyptian potter had to learn and to replicate those in experimental reconstructions using replica potters' wheel bearings based on the Egyptian standard. Understanding the techniques that the Egyptian potter had to master, combined with the pictorial, textual and circumstantial evidence, it is anticipated that new insights into the production and organisation of ancient pottery workshops will be apparent.