Domestic cattle breeds in ancient Egypt from the predynastic period through the end of the old kingdom

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The American University in Cairo

School of Humanities and Social Sciences

Domestic Cattle Breeds in Ancient Egypt from the Predynastic Period Through the End of the Old Kingdom

A Thesis Submitted to

The Department of Sociology, Egyptology, and Anthropology (SEA)

In partial fulfillment of the requirements for

The Degree of Master of Arts

By: Katherine M. Bateman

Under the Supervision of Dr. Salima Ikram
First Reader: Dr. Mariam Ayad
Second Reader: Dr. Louise Bertini

May, 2018
Dedication

To T.J. Bateman and R.M. Shinhearl. Your love, forgiveness, and loyalty know no bounds.
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Finally, I would like to thank my family for supporting every dream I have ever had. For this, I am blessed.
Abstract

From the Predynastic Period through the end of the Old Kingdom phenotypically diverse cattle existed in Egypt. In the literature, cattle from this time period are currently identified by their horns: the longhorn, shorthorn, and hornless. Identifying cattle based on the size of their horns is an inaccurate classification method because horn length and shape varies within a single breed due to factors such as age, sex, and diet, and the words used to describe length (short, medium, and long) are often subjective. This study analyses representations, textual evidence, and physical remains of ancient Egyptian domesticated cattle and attempts to group them into breeds based upon multiple physical characteristics. The goal is to determine the number of cattle breeds (phenotypically expressed) that existed from the Predynastic Period through the end of the Old Kingdom. In this study ‘breed’ is defined as a group of animals that, as a result of deliberate breeding by humans for selected traits, have certain distinguishable characteristics. The physical characteristics that are analyzed in order to group the cattle into breeds include: horn length and shape, general skull morphology, dewlap size, presence of a cervico-thoracic hump, back shape, tail length, switch shape, and coat color/s. An analysis of the available evidence suggests that there may have been up to six different breeds of cattle during this time period. Some breeds may have been brought from neighboring territories such as Nubia, Libya, and the Near East via trade and/or diplomatic/military missions, while some may have been indigenous to Egypt, the descendants of domesticated wild aurochson. The ancient Egyptians possibly had specialized breeding programs, in which they intentionally crossed different breeds of cattle in order to produce new breeds that were tailored to their needs.
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Chapter 1: Introduction

Cattle were highly important to the ancient Egyptians as sources of food and raw materials, and they also prevailed in ancient Egyptian royal and non-royal iconography. Artistic evidence shows that from the Predynastic Period through the end of the Old Kingdom, phenotypically diverse cattle existed in Egypt. Agricultural, sacrificial, mating, and calving scenes found in tombs display cattle that differ in many aspects including the size and shape of their horns, the size and form of their bodies, and the color of their coats. Many scholars (Erman 1885, 580; Boessneck 1988, 69-70; Houlihan 1988, 11; Brewer et al. 1994, 82-84; Osborn and Osbornová 1998, 195) have suggested the existence of three different types of cattle from this time period based primarily on the size of the animal’s horns namely: the longhorn, shorthorn, and hornless.¹ However, identifying cattle based on the size and shape of their horns is an inaccurate classification method because horn length and shape varies within a single breed due to factors such as age, sex, and diet (Neff et al. 2016, 9; Grigson 1991, 130-131; Armitage and Clutton-Brock 1976, 330-331; Ghoneim 1977, 49) and the words used to describe length (short, medium, and long) are often subjective as they are not defined in Egyptian art when used to describe cattle horns.

This study will analyze representations, textual evidence, and physical remains of ancient Egyptian domesticated cattle and attempt to group them into breeds based upon multiple physical characteristics in order to determine the number of cattle breeds that existed from the Predynastic Period through the end of the Old Kingdom. For this study breed will be defined as a group of animals that, as a result of deliberate breeding by humans for selected traits, have certain distinguishable characteristics (Briggs and Briggs 1980, 2). The physical characteristics that will be analyzed in order to group cattle into breeds include horn length and shape, general skull morphology, dewlap size, presence of a cervico-thoracic hump, back shape, tail length, switch shape, and coat color/s (see fig. 1.01 for labeled illustration). Other breed characteristics, such as

¹ Epstein is not included here because he does not consider polled cattle as a distinct type, but as a variation of either long-horned cattle or short-horned cattle (Epstein 1971, 196).
heat tolerance, food efficiency, milk production, and calving ability, can not be analyzed from the evidence used in this study. Of course, one must be cautious when using artistic evidence, as it is subject to multiple problems and limitations, which will be discussed in detail in Chapter 2.

In addition to analyzing these physical characteristics, other approaches, such as trying to locate the geographical origin of a certain type of cattle and reviewing contemporary historical information, will be used to classify breeds (Felius et al. 2011, 686-697). Each proposed breed will be assigned a letter instead of a modern breed name, because the extant cattle population in Egypt may not be an accurate reflection of the cattle from the Predynastic Period through the Old Kingdom due to cross-breeding with imported zebu and taurines and the effects of the Rinderpest in the 19th and 20th centuries (Grigson 1991, 120). DNA analysis of the physical remains of cattle from the Predynastic Period through the Old Kingdom will not be considered due to restrictions of time, finances, and permits.

The importance of cattle in all levels of ancient Egyptian society is undeniable. They functioned as a familiar icon of the pharaoh and were the force that pulled the plow in a farmer’s field. In addition to their symbolic role, and their use as draft animals, cattle yielded a wide range of secondary products, including meat, milk, fat, blood, hide, sinew, manure, and horns, which made bovines an invaluable resource (Boessneck 1988, 69-70; Ikram 1995, 8; Houlihan 1996, 10; Osborn and Osbornová 1998, 195). Their meat, primarily taken from males, as cows were used for reproduction and milk production, was consumed and also used as provisions for the deceased in the afterlife (Andersson 1912, 145; Boessneck 1988, 68; Ikram 1995, 8-10). The milk produced from cows could have been used to make products such as cream, butter, and possibly cheese (Ikram 1995, 12). Cow’s milk was also occasionally used in medical prescriptions as can be seen in the Kahun Medical Papyrus where a remedy for discharges of the womb included “1 hin of cow milk…” (Ikram 1995, 8; Collier and Quirke 2004, 58). Their fat could be used for cooking and cosmetics and their manure as fuel, fertilizer and building material (Ikram 1995, 8; Barta 2011, 316-318). Their hide, horns, and bones could be used to form clothes, weapons, and artifacts (Ikram 1995, 8). Cattle were also used for agricultural labor, such as plowing fields and
treading grain (Houlihan 1988, 17-18). Finally, cattle could pull large objects including chariots, as illustrated in the New Kingdom tomb of Huy (TT40) and funerary sleds, as seen in the Old Kingdom tomb of Idu (G 7102) (Davies and Gardiner 1926, pl. 23; Simpson 1976b, fig. 35; Houlihan 1988, 17-18). Cattle were key components of the ancient Egyptian economy, and a measure of royal wealth in particular, as is attested by the regular cattle counts that were fiscal censuses of livestock held for taxation purposes (Nolan 2008, 46).

The importance of cattle is also illustrated by their use as a symbol in Egyptian writing. There are five signs from Gardiner’s sign list that are full body depictions of cattle: E1, E2, E3, E4, E5, and 13 signs that represent parts of cattle: F1, F2, F13, F14, F15, F16, F17, F23, F24, F25, F27, F28, F29. The latter examples exclude bones and internal organs. There are approximately 60 words that describe bovines (Appendix A; Erman and Grapow 1926; Faulkner 1991; Mastropaolo 2013). This number excludes bovine deities, products procured from cattle, tools used with cattle, and titles for jobs that are associated with cattle.

Cattle also appear in the names of ancient Egyptian nomes and towns. In Lower Egypt the symbols for nomes 6, 10, 11, and 12 each contain an individual bovine while in Upper Egypt the symbol for nome 7 is a sistrum with the head of the goddess Bat (Fischer 1962, 7; Baines and Malek 2000, 15). The names of some towns also included words for cattle in them. For example, Farafra Oasis was named ta-iHw, translated as Land of the Cows (Faulkner 1962, 293; Cappozza and Palombini 2014, 55). This name may be connected to the cult of the goddess Hathor, or alternatively to the seasonal grazing land that may have been located there (Cappozza and Palombini 2014, 55). Another town with a word for cattle in the name is tpj-iHw, or Head/First of the Cows, Greek Aphroditopolis, modern-day Atfih (WB I, 120; Faulkner 1962, 296). Tpj-iHw was home to the Hesis cow, which was chosen by its particular markings and regarded as an incarnation of the goddess Hathor (Rowlandson 1998, 49). After the cow died, it was mummified and buried in a designated necropolis adjacent to the city (Mission égypto-française d’Atfih 2010, 138).
These animals also figured prominently in literature, such as *The Tale of Two Brothers* and *The Lion in Search of Man*. In *The Tale of Two Brothers* the lead cow warns her herdsman that his brother is standing outside of the barn waiting to kill him, and in *The Lion in Search of Man* an ox and a cow tell the lion all of the discomforts that man has inflicted upon them such as clipped horns and nose rings (Simpson 2003, 84; Lichtheim 1980, 158). It is clear that cattle were an integral part of the daily lives of ancient Egyptians, so much so that these animals were awarded lead roles in stories and were often anthropomorphized as can be seen in *The Tale of Two Brothers* in which the cattle speak to the younger brother (Simpson 2003, 81).

In the realm of the divine king, bulls were an integral part of the royal iconography and regalia because not only was the animal strong and virile, but also, it was known to be capable of sudden and decisive action, traits ideal for a self-assertive monarch (Wengrow 2001, 94-95). The king’s regalia included a bull’s tail and sometimes a row of pendants attached to his belt depicting the bovine goddess Bat (Wengrow 2001, 94). The tail invoked the strength and power of the bull and the representations of the goddess Bat may have been related to the unity of Egypt (Wilkinson 2003, 172). Finally, from the 18th to the 23rd Dynasty *kȝ-nḥt*, ‘Strong/Victorious Bull’, became an important part of the royal Horus name, once again stressing the continued connection between the king and the ideal traits of the bull (Von Beckerath 1984, 11-12; Ikram 1995, 8; Hendrickx 2002, 298).

Multiple Egyptian deities, both male and female, were represented as bovines (Wilkinson 2003, 170). Male bovine deities such as Apsis, Buchis, Mnevis, and the Sky Bull (Bull of the West) could have cosmic associations but generally represented the power and sexual potency embodied by the bull (Wilkinson 2003, 170). Female bovine deities including Bat, Hesat, Mehet-Weret, Shentayet, and Hathor often represented the powers of creation and fecundity (Wilkinson 2003, 170). Many of these bovine divinities were important figures in religious literature such as the Pyramid Texts, Coffin Texts, The Book of the Dead, and The Book of the Heavenly Cow (Wilkinson 2003, 171-175; Simpson 2003, 289-298).
Cattle were also an integral part of the funerary sphere. They were associated with certain funerary rituals including one related to the tekenu where the hide, heart, and foreleg of a bull were buried alongside this enigmatic object (Tassie 2000, 39). In the Predynastic Period some cattle were buried independently, as can be seen at the sites of Badari and Nabta Playa (Flores 1999, 100; Brass 2003, 105-108), or alongside humans as at the site of Tushka (Hendrickx 2002, 275). They were also incorporated into funerary architecture as can be seen in some First Dynasty tombs at Saqqara, where bucrania were used to decorate the outside of mastabas (Emery 1954, pl. 6a-b; 7a-b). Bucrania were also used to decorate certain tombs at the Upper Nubian site of Kerma, a tradition that became quite common during the Middle Kerma Period (c. 2050-1750 B.C.) (Van Dijk 2013, 452). The use of bucrania in tomb architecture may have simultaneously reflected the wealth and power of the deceased and afforded protection to the structures they decorated (Van Dijk 2013, 459).

Thus, the symbolic and practical uses of cattle permeated all levels of ancient Egyptian society, and it is probable that they were managed and bred in order to fulfill a myriad of roles. The following chapters will present the methodology employed in this study (Chapter 2), the available literature on the subject (Chapter 3), followed by the data employed to establish breeds: representations of cattle (Chapter 4), textual evidence of cattle (Chapter 5), and physical remains of cattle (Chapter 6), and finally, the conclusion (Chapter 7).
Figure 1.01 - General physical characteristics of cattle and terminology (Holstein Foundation, Inc. No Date, 5; unlabeled drawing Copyright ©2017 ColoringPages101.com)
Chapter 2: Methodology

2.1 Introduction

The three types of evidence used to identify cattle breeds in this study are representations, textual evidence, and physical remains. All material for this study comes from the Nile Valley, north of the First Cataract through the Delta, and dates from Merimda Neolithic I, ca. 4800 BC (Hassan 1988, 142), through the end of the Old Kingdom, ca. 2175-2125 (Baines and Malék 2000, 36).²

2.2 Breed

A breed is a group of animals that, as a result of deliberate breeding by humans for selected traits, have certain distinguishable characteristics, including, but not limited to, horn length, body size, and coat color (Briggs and Briggs 1980, 2). Unfortunately, the physical characteristics that define a breed are often arbitrary due to factors such as cross breeding, variation within breeds, and changes over time within breeds due to new breeding objectives, preferences, and consumer requirements (Felius et al. 2011, 663-665). Cross breeding is often used as a strategy for upgrading certain production characteristics. For example, in Pakistan Sahiwal cattle were extensively crossbred with exotic breeds, such as the Holstein, in order to improve milk production (Porter et al. 2016, 288). Notable variation within a breed can be seen in the Belgian White-Blue breed, where some are extremely heavily muscled and others are less heavily muscled (Felius et al. 2011, 664-665). Finally, an example of evolution within a breed can be seen in the case of Dutch-Friesian cattle. In the late 19th century Dutch-Friesian cattle were large, single purpose dairy cattle, but by the 1950’s they became small, deep bodied, and dual-purpose animals, used both for meat and dairy (Felius et al. 2011, 665).

² One cattle skeleton comes from Nabta Playa and might be slightly older than the Merimda Neolithic I Period.
2.3 Materials and Methods

A database was created to document two- and three-dimensional representations of cattle in Egyptian art that form the basis of this study. The database is divided into the following sections: cattle figurines, objects with depictions of cattle on them, and representations of cattle in tomb scenes. Information on each cattle figurine and object bearing a depiction of cattle include the following: museum, museum inventory number, abbreviated image reference (author last name, publication date, page #), date, material, provenance, context, horn size, horn shape/angle of protrusion, general skull morphology, dewlap size, withers, back shape, tail length, switch shape, color, sex, text associated with the animal, activity in which they are engaged, and notes. Representations of cattle within tombs are organized by site, progressing from north to south. The information that is recorded for each bovine representation in a tomb includes: tomb owner, tomb number, abbreviated image reference (author last name, publication date, page #), date, scene type (offering, inspection, receiving of tribute, or exception), location in tomb, horn size, horn shape, angle of protrusion, general skull morphology, dewlap size, presence of cervico-thoracic hump, back shape, tail length, switch shape, color, sex, textual evidence, activity, notes, and bibliography. If there are multiple registers of cattle in two-dimensional representations, objects with depictions of cattle on them and tomb scenes, the register number is noted in the image reference cell. For this study the bottom register is always the first, the second from the bottom is the second and so on. For consistency, multiple cattle within a register are analyzed from left to right. Unavailable information due to its absence or the poor preservation of the material is indicated by NA.
Representations can be very useful when recording the characteristics of ancient Egyptian cattle, but when referring to them, one must still consider them with caution. Although the ancient Egyptians tried to depict their wildlife with great accuracy (Evans 2010, 1), even they were subject to some limitations. In Predynastic and Early Dynastic art, the rendering of horns became idealized and uniform, taking the shape of crescent horns, or as Hendrickx calls it, ‘incurved’ horns (2002, 279). For cattle represented in tomb scenes from the Old Kingdom, one must consider that the artists may have used picture templates (Ghoneim 1977, 48). The implications of using templates, especially outdated ones, are that the pictured scenes did not depict reality, but rather an archaic ideal, an even greater problem when looking at representations after the Old Kingdom (Ghoneim 1977, 48; Boessneck 1988, 69). One must also consider other factors such as an artist’s style, limitations of space, and the grammar of the representation, particularly with regard to depicting size, which would influence how the cattle were represented, and diverge from the reality of cattle types present in the region. Additionally, pigment is often missing, or might have changed over time, making the original coat color and pattern indiscernible. Thus, one has to exercise caution when using the artistic record and be aware that there might be faults in the study. However, as the pictorial evidence is a major source of information, it cannot be ignored, and the caveat that the final conclusions might be biased due to artistic conventions must be acknowledged.

Three different types of representations, spanning a 2,600-year period, are included in this study: three-dimensional objects, two-dimensional representations on objects, and representations of cattle in tomb scenes. The representations come from multiple locations throughout the Nile Valley and the Delta. The extended time period, the different types of representations, and the broad geographic range of the representations, provide examples of cattle rendered by different artists, which increases the probability of observing cattle that reflect the extant population.

Three-dimensional representations of cattle include full-body figurines, realistic/clearly
recognizable bovine heads, flint carvings, and ‘double bull’s head’ amulets. Full body figurines had to possess at least one intact horn in order to determine its size and shape. A frontal view is the best way to determine the shape of the horns as can be seen in a drawing by Lortet and Gaillard (fig. 3.05) (1903, 45). This drawing shows the skull of a bovine depicted from the side and the front. The angle of the horns from the side view suggest lyre-shaped horns; however, when they are viewed from the front they are clearly crescent-shaped (Lortet and Gaillard 1903, 45). If the available image of an object only shows the profile of the animal, it will only be included in this study if it presents post-cranial characteristics, such as the dewlap, cervico-thoracic hump, or back. In these cases, a horn shape may be suggested. Some problems associated with analyzing full-body figurines of cattle, especially from the Predynastic Period, are that the entire figurine can be quite abstract, giving detail only to elements such as the horns and genitalia, and the horns are often broken.

The second type of three-dimensional object that is analyzed is bovine head amulets, an example of which can be seen in figure 4.01a. The horns had to protrude from the head so that their length and shape could be analyzed.

The third type of three-dimensional bovine representations are flint carvings (pl. iiiia). Flint carvings may be full-bodied representations or simply the head. Unfortunately, many lack intricate facial details making correct species identification sometimes difficult. There is often difficulty determining if some of the flint carvings are of cattle, hartebeest, or barbary sheep (Osborn and Osbornová 1998, 4; Hendrickx 2002, 279).

The final type of object that is considered is the double bull’s head amulet (fig. 4.01b) (Hendricks 2002, 281).

The objects that are not included in this study are siltstone palettes and the so-called ‘bull’s head’ amulets (Hendrickx 2002, 286). Siltstone palettes are not included because they lack details which are necessary to make a proper species identification. The objects referred to as ‘bull’s head’ amulets are so stylized that it has led scholars to interpret them as ram heads (Petrie
elephant heads (Van Lepp 1999), or ambiguous objects with both human and bovine characteristics (Baumgartel 1960, 73-74; Hendrickx 2002, 285).

Two-dimensional representations of cattle on pottery, palettes, ostraca, mace heads, ivory luxury goods, and seals have their own issues related to their analysis, particularly the often-poor state of preservation, and the small size of the objects, which make determining significant details of the cattle quite difficult. A further problem is establishing if the depicted cattle are domestic or wild. Since this study focuses on domesticated cattle, it is important to eliminate as many wild cattle as possible while retaining the domesticated cattle. In imagery, context provides the clue to whether an animal was domesticated or wild. Therefore, cattle pictured with other wild animals in hunting scenes will be eliminated, as can be seen on the so-called ‘Two-Dogs palette’ (AN1896-1908E.3924), along with cattle depicted on mountains as can be seen on the Min statue at the Cairo Museum (JE 30770), as these types of representations may not depict domesticated cattle, and the date of the latter is also debatable. Finally, bovine deities are not included in this study as they are often pictured in a highly stylized manner, as can be seen on the celestial bovine palette (34173) at the Cairo Museum where the horns and ears terminate into stars, and they are often anthropomorphized as can be seen on the bovines surmounting the Narmer Palette (CG14716/JE32169).

The final group of representations featuring cattle comes from non-royal tombs. Tomb scenes from Giza, Abusir, Saqqara, Meidum, Deshasha, Tehna, Meir, Deir el-Gebrawi, el-Hagarsa, Naga ed-Dër, el-Qasr wa ‘l- Saiyad, Qift, Thebes, and Qubbet el-Hawa, are studied in order to gain knowledge about cattle and how they are depicted from a broad geographic range. As might be expected for the Old Kingdom, the majority of tombs are from Giza and Saqqara. Offering, inspection, and receiving of tribute scenes are analyzed in this study because they often include live adult cattle that are individually labeled. Also, captions for these scenes often include the origins of the cattle that are being presented. Butchery scenes are omitted from this study because many physical characteristics of the cattle cannot be analyzed due to their awkward position. Agricultural scenes are omitted from this study due to time restrictions. Offering scenes
with cattle are often associated with the words *ndt-hr* and *prt-hrw* (Altenmüller 2006, 25). *ndt-hr* describes scenes in which a person is about to greet the deceased with offerings that they have in their hands (Altenmüller 2006, 25). *prt-hrw* are offerings from the funerary estate, including desert animals, cattle, and fowl, which are delivered to the tomb owner (Altenmüller 2006, 25). Inspection scenes include when the tomb owner is overlooking acts associated with the counting of cattle or cattle tax, *irw* (Faulkner 1991, 27), or when being presented with cattle from various estates throughout the region. The last type of scene, receiving of tribute, often includes text that details the origins of the cattle and numbers labeling the quantity.

Finally, there are a few exceptions to these general rules. First, the temple of Sahure at Abusir is included because it contains images of imported/looted cattle coming from Libya, which may provide more information about cattle breeds from outside Egypt (Borchardt 1913b, pl. 1). Cattle from scenes other than those chosen for this study are included if the animals are a notable exception. For example, cattle depicted with short horns are a minority in Old Kingdom tomb scenes and those that are found, say within a river fording scene or an agricultural scene, are included in the study in order to have a larger set of data for short-horned cattle. All other exceptional cattle will be discussed on a case by case basis in Chapter 3.
2.5 Recording Physical Characteristics of Cattle in Representations

The first step towards classifying cattle into breeds is to record their physical characteristics. The physical characteristics considered in this study include horn length and shape, general skull morphology, dewlap size, presence of a cervico-thoracic hump, back shape, tail length, switch shape, and coat color/s. This review begins with the head and works back towards the tail.

The three major characteristics of the horns that are considered are their length, shape, and the angle at which they protrude from the skull. In order to describe the horn length of cattle from representations and maintain some form of objectivity, a simple process has been proposed. For each animal two measurements are taken. The first, designated ‘H’, is the length from the poll to the top of the horns, in other words the height of the horns (fig. 2.01a). The second measurement, ‘F’, is the length of the face (fig. 2.01a). H divided by F gives us X. If X is greater than or equal to 1.7, then the horn length is considered extra-long (fig. 2.01b). If X is less than 1.7 and greater than or equal to 1.26 the horn length is considered long (fig. 2.01c). If X is less than 1.26 and greater than or equal to .86 the horn length is considered medium (fig. 2.01d). Finally, if X is less than 0.86 the horn size is considered short (fig. 2.01e). These boundary numbers were produced from the examples given in figure 2.01. These four examples were chosen by comparing multiple depictions of cattle and choosing the best exemplars of each type. This method of determining horn length is most useful when applied to representations of cattle in tomb scenes, as most of the cattle are of a reasonable size and are presented with a frontal view of the horns. This method is less effective when applied to cattle figurines or objects with cattle depicted on them, because many representations of cattle on objects are simply too small to apply this formula. Also, this formula does not accurately measure long horns with a short height, an example of which can be seen in fig. 2.01f (author’s photograph). Because of the short height of the horns, the formula would have outputted a small number suggesting that the horns are short or medium, when clearly they are not. In these uncommon cases, the author will consider how far the horns reach back towards the withers. If the horns terminate at the withers or pass them, the length is considered long to extra-long. If the horn is between the ear and the withers
the length is considered medium. Finally, when the formula can be applied to a representation, $X$ is recorded and when the formula cannot be applied the author puts forth a suggested horn length.

Figure 2.01-a. Explanation of Variables, H=height of horns, F=length of face (Atet (mastaba 16), Meidum; Petrie 1892, pl. 23) b. Extra-long, $H=.63'' F=.38'' H/F=1.7, X \geq 1.7$, (Atet (mastaba 16), Meidum; Petrie 1892, pl. 23) c. Long, $H=.63'' F=.5'' H/F=1.26, 1.26 \leq X < 1.7$, (Rahotep (mastaba 6), Meidum; Petrie 1892, pl. 9) d. Medium, $H=.43'' F=.50'' H/F=.86, .86 \leq X < 1.26$ (Mekhu and Sabni (A1), Qubbet el-Hawa; De Morgan 1894, 148) e. Short, $H=.2'' F=.38'' H/F=.53, X < .86$ (Djau (S12), Deir el-Gebrawi; Kanawati 2013, pl. 63) f. (Saqqara; The Museum of Egyptian Antiquities, Cairo JE70149) Author’s photograph
Horn shapes are assigned to each animal based on options from a template provided in figure 2.02. Hartmann suggests and describes three horn shapes: lyre, crescent, and horns more or less equal distance from one another (Hartmann 1864, 25). Ghoneim supports Durst’s opinion that there were only two shapes, lyre and crescent, and that horns that were equidistant from each other were the original lyre-shape (Ghoneim 1977, 50). For this study if the tips of horns flare outwards or are parallel to each other they are considered lyre-shaped, but to avoid ignoring the obvious variation within the lyre-shape classification, horn tips flaring outwards are labeled “lyre 1”, and horn tips parallel to each other are labeled “lyre 2” (fig. 2.02a-b). For crescent-shaped horns two variations are recorded, one with a shallow curve where the tips of the horns are far apart, crescent 1, and one with a deep curve where the tips are almost touching, crescent 2 (fig. 2.02c-d). Downward curving horns, as seen in figure 2.02e, are recorded as such, but are considered a subtype of crescent 2 horns. The downward appearance may be the result of horn deformation, or, related to the moment of the horn’s rotation (Epstein 1971, 320-321). Other shapes that are recorded include, v-shaped horns and deformed horns (fig. 2.02f-g). Hornless cattle are assigned either a rounded head or a flat head (fig. 2.02h-i). Finally, the angle at which the horns protrude from the skull, either horizontally or diagonally, is recorded.
Figure 2.02- a. Lyre 1 (Rahotep (mastaba 6), Meidum; Petrie 1892, pl. 9) b. Lyre 2 (Mekhu and Sabni (A1), Qubbet el-Hawa; De Morgan 1894, 148) c. Crescent 1 (Ptahhotep (31), Saqqara; Lepsius 1849-1859, pl. 104a) d. Crescent 2 (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 92) e. Downward curving (Pepyankh the Black (A2), Meir (Kanawati 2014, pl. 82) f. V-shaped (Mereruka, Saqqara; The Sakkara Expedition 1938b, pls. 168-169) Courtesy of the Oriental Institute of the University of Chicago g. Deformed (Ihy, Saqqara; Kanawati and Abder-Raziq 2003, pl. 71) h. Hornless rounded head (Ni-Ankh-Pepi (A1), Meir; Blackman 1953, pl. 11) Courtesy of Egyptian Exploration Society i. Hornless flat head (Ptahhotep (31), Saqqara; Lepsius 1849-1859, pl. 102a)
Horn length and shape are important to consider when trying to identify cattle breeds, as can be seen in modern breeds such as the Kuri cattle of Lake Chad and the West African Shorthorn (Joshi, et al. 1957, 10-11), although caution must be taken when using the horns to differentiate cattle breeds because the horns grow continuously throughout the animal’s life, and therefore will exhibit different sizes throughout maturity, and there is also strong sexual dimorphism exhibited within breeds (Grigson 1991,132).

Skull morphology is more difficult to identify and quantify from depictions as most representations are either too small or do not provide enough detail to measure features such as the intercornual ridge line or the least frontal breadth (fig. 3.03). Also, although the majority of horns are presented in frontal view, many of the faces are shown in profile, which prohibits describing the shape of the face as triangular or parallel, such as Grigson does as one way to differentiate between taurine cattle and Sanga cattle (1991, 121). Although there are major limitations, the profile of the face can still be described as convex, straight, or concave, and the general size of the head can be described as proportionate to the body, or not proportionate to the body, either quite big or quite small. Once more, skull morphology can help distinguish between breeds, for example, modern day Jersey dairy cattle are said to have a refined head, well chiseled bone structure, slightly dished face, and dark eyes that are well set, while a Brown Swiss has a broad muzzle, large nostrils, a strong jaw, large and bright eyes, a broad and slightly dished forehead, and a straight nose bridge (Holstein Foundation, Inc. No Date, 6).

Breed differences can be apparent in the morphology of the skull, but certain characteristics and proportions of the skull depend on other factors, such as the size and sex of the animal, rather than breed (Grigson 1974, 120). Another phenomenon that alters the morphology of the skull is related to the horns of the animal. Variation in the region of the poll, processus cornu ossis frontalis (horn necks)/torus frontalis, is thought to be determined by the length, weight, and time of rotation of the horns (Epstein 1971, 320-321; Felius et al. 2011, 669).

Another issue of skull morphology is associated with hornless and polled cattle, and how to differentiate between the two. The term hornless is defined as a type of cattle that lacks horns
due to selective breeding, and the word polled describes cattle that have had their horns manually removed. Andersson differentiates hornless and polled cattle in representations by the shapes of their heads, the former with a round head and the latter with a flat head (Andersson 1912, 161, 164). Regarding these observations, one may refer to images from the studies of Lortet and Gaillard (1907) (fig. 2.03), which display three cattle born without horns (fig. 2.03a-c) and one that had its horns removed at a young age (fig. 2.03d). The cattle born without horns (fig. 2.03a-c) display a more rounded head than the bovine that had its horns removed (fig. 2.03d).

Without looking at other examples one may, with hesitation, agree with Andersson that hornless cattle have rounded heads and polled cattle have flat heads (1912). However, by examining additional examples, his conclusions do not hold. Dehorned (polled) cattle do not necessarily have flat heads (fig. 2.04a-b), and cattle that are naturally hornless do not necessarily have round heads (fig. 2.05).

Another method to differentiate between hornless cattle and polled cattle was proposed by Lortet and Gaillard. They wanted to determine if the remains of cattle without horns found in the 11th Dynasty tomb of Ament at Deir el-Bahri were from a hornless breed or if their horns were artificially removed (Lortet and Gaillard 1907, 59). They analyzed five modern skulls; three from cattle born naturally hornless that originated from Iceland and Suffolk, and two from Normandy cattle that were dehorned at a young age (Lortet and Gaillard 1907, 65). For each specimen, they compared the length of the skull, taken from the upper edge of the occipital hole to the transverse orbital line, with the length of the frontal, taken from the upper end of the poll to the transverse line of the supraorbital line. They found that the length of the skull in naturally hornless cattle is always larger than the length of the frontal, while in cattle that have been dehorned the length of the skull is always smaller than the length of the frontal (Lortet and Gaillard 1907, 66). Although the patterns they saw were only from a handful of examples and were insufficient to establish a general law, they decided to take the same measurements from the skulls at Deir el-Bahri (Lortet and Gaillard 1907, 66-67). When they measured the skulls from Deir el-Bahri they found that the length of the skull was larger than the length of the frontal and thus concluded that these ancient cattle were from a hornless breed and had not been dehorned.
(Lortet and Gaillard 1907, 67). Whether this method is accurate or not, it cannot be applied to representations of cattle in tomb scenes because the heads of these cattle are presented in a profile view, which prohibits taking the measurements that Lortet and Gaillard did to perform their study. Therefore, this author finds that it is impossible to determine, from a representation in a tomb, whether a bovine was naturally hornless or if it was dehorned later in life.
Hornless breed Deir el-Bahri (Lortet and Gaillard 1907, 60 figs. 129, 130)

Hornless breed Deir el-Bahri (Lortet and Gaillard 1907, 61 figs. 131, 132)

Modern hornless breed (Lortet and Gaillard 1907, 63 figs. 134, 135)

Horns artificially removed at young age (Lortet and Gaillard 1907, 65 figs. 136, 137)

Figure 2.03
**Figure 2.04**  a. Dehorned and horned Jersey cow (Neff et al. 2016, 15) b. Half of a skull with horns (left) and that of a cow dehorned as a calf (right) (Neff et al. 2016, 15)
The remainder of the postcranial physical characteristics are slightly simpler to describe. The dewlap size falls within two groups: either absent to small or moderate, and the cervico-thoracic hump is recorded as either present or not present (fig. 2.06a-b). The back shape is analyzed starting from behind the withers and is listed as either straight or concave. The length of the tail can be described as at or above the hocks, at or above the dewclaws but below the hocks, and below the dewclaws. The switch shape is recorded as either having a flat end or round end.

Figure 2.05- Frontal view of naturally hornless skull (Armitage and Clutton-Brock 1976, 333 fig. 1)
The coat color is considered quite an important characteristic when identifying modern breeds of cattle, so much so that the color is often included in the name of the breed, such as Brown Swiss, Red and White, and Dutch Belted (Felius et al. 2011, 671). Coat color can be an easy key for classification, although it must be remembered that different breeds of cattle can exhibit very similar markings and color, such as the Norwegian Red and Swedish Red-and-White, and therefore other physical characteristics in addition to coat color must be considered when identify breeds (Felius et al. 2011, 674). In this study, the color of a bovine is recorded when present. Unfortunately, due to the age of such representations and often poor preservation, many of the colors are greatly faded or completely absent, and there is also the issue that artistic license might have been in play when painting the images.

The sex of the animal is assigned based on visible genitalia (fig. 2.07). If the animal possesses udders it is a cow, if it has a penis and lacks a scrotum it is identified as an ox, and if it has both a penis and scrotum it is labeled a bull. This method will suffice for this study, although it should be mentioned that some bulls still had a nearly intact scrotum after castration (Ikram 1995, 10). If the genitalia are not visible the sex is not assumed, although when appropriate a suggestion based on context and/or text may be put forth.

Figure 2.06-a. Example of a bovine with small dewlap and no cervico-thoracic hump (after Grigson 1991, 121 fig. 1) b. Example of a bovine with a moderate dewlap and a cervico-thoracic hump (after Grigson 1991, 121 fig. 1)
2.6 Textual Evidence- Parameters and Problems

Sources of textual evidence used in this study include words associated with cattle in tomb scenes and any other document within the specified time period that mentions cattle. In order to be included in this study, words relating to cattle must be spelled with letters and not just a determinative. This is important because Gardiner’s E1 sign can be a determinative for multiple words describing cattle including $k3$, $ng$, $iw\text{s}$, and $mnmn$ (Gardiner 1957, 458). Words associated with cattle in tomb scenes are analyzed in order to see if some words are associated with certain breeds of cattle. Next, words for cattle in other documents are used in order to establish the origins of certain types of cattle, as the classification of cattle based on geographical origin is largely in agreement with the breed clusters indicated by biochemical and molecular genetic analysis (Felius et al. 2011, 661). Thus, in lieu of genetic studies on ancient Egyptian cattle breeds, textual evidence indicating the origins of cattle is used as an inferior substitution. The

Figure 2.07-Sex of Cattle (Armitage and Clutton-Brock 1976, 343 fig. 11)
paucity of material preserved on papyrus is an issue, as is the damaged nature of some of the material appearing on tomb walls.

2.7 Faunal Remains- Parameters and Problems

The final source of evidence used in this study are the physical remains of cattle. The intention is to analyze the remains of domestic cattle only, although sometimes differentiating between domestic and wild cattle from the faunal remains is difficult and problematic (Brewer et al. 1994, 81). Faunal remains are considered from sites throughout the Nile valley, Nabta Playa, and the Delta. Only skulls are analyzed since there is limited information on how to identify breeds of cattle from postcranial bones (Grigson 1991, 120). For inclusion in the study, skulls had to have had either one intact horn or horn core, and the horns had to be pictured from the front. For skulls that only display horn cores, the original horn length is estimated according to the method used in Armitage and Clutton-Brock (1976). In these cases, the original size of the horn is estimated from the length of the horn core, taken from the posterior-dorsal (outer) curve, and placed into one of the following categories: small, short, medium, and long (Armitage and Clutton-Brock 1976, 331). Measurements of additional cranial characteristics and other information, such as the age and sex of the animal, is limited to what is provided in the publications. Finally, the best-preserved bucraania come from funerary contexts rather than from settlements and, therefore, may not be representative of the extant cattle population in ancient Egypt.
Chapter 3: Issues of Domestication and Identification: A Review of the Literature

3.1 Wild Cattle, Causes of Physical Variations, and Domestication Theories

Wild cattle, or aurochsen, existed in Egypt until the 3rd Dynasty (Personal communication, Louise Bertini, based on unpublished faunal data from Mendes, Egypt). Aurochsen in North Africa are identified as *Bos primigenius opisthonomus* or *Bos primigenius mauretanicus* (Clutton-Brock 1987, 63; Epstein 1971, 189 fig. 194, 231-232; Brewer *et al.* 1994, 80). Aurochsen were browsing and grazing ruminants, successful in the late Pleistocene and early Holocene epochs (Clutton-Brock 1987, 63; Brewer *et al.* 1994, 80; Legge 2010, 26). They were widespread over most of the northern hemisphere, except North America, and inhabited forests and open scrubs and thrived in temperate regions (Clutton-Brock 1987, 63; Brewer *et al.* 1994, 80; Legge 2010, 26).

3 The existence of *Bos primigenius* has been proven up until the 2nd Dynasty at Mendes.
The physical characteristics of aurochsen, and all cattle for that matter, are partly influenced by their geographical location. Cattle from cooler climates typically have a lower surface area to mass ratio, which minimizes the rate of heat loss per unit of mass, than cattle from warmer climates (Hahn 1985, 85). As a result, cattle from cooler areas tend to have shorter horns, which reduces the surface area through which heat is lost, thus helping them to conserve heat, while cattle from warmer areas, such as Egypt, have longer horns giving them a larger surface area to expel heat (Picard et al. 1999, 148; Neff et al. 2016, 3).

The coats of aurochsen also vary by geographical location; for example, the bulls in northern and central Europe were black, often with white markings on the forehead and a white stripe running along the back, while the cows and calves had a more or less red coat (Clutton-Brock 1987, 64). In the south, including Egypt, the coats of aurochsen were probably pale in color (Clutton-Brock 1987, 64; Brewer et al. 1994, 80).

Aurochsen, and domesticated cattle, display marked sexual dimorphism (Ghoneim 1977, 50; Boessneck 1988, 69). Cows are smaller than bulls, both of which are generally smaller than the oxen, or castrated males. Cows are light at their forequarters and heavier at their hindquarters due to the larger stomach, especially during pregnancy (Neff et al. 2016, 4). Bulls on the other hand carry a disproportionate amount of weight on their forequarters because they possess a powerful head, and broad shoulders, while their belly and hindquarters are more finely developed (Hartmann 1864, 25; Andersson 1912, 147; Ghoneim 1977, 53; Neff et al. 2016, 4). In oxen, the removing of the testes at a young age results in the bones growing more in length than in girth causing the animal to have longer and more slender extremities (Clutton-Brock 1987, 25; Boessneck 1988, 69; Ikram 1995, 12).

Significant differences in horn length and shape between the sexes are also physical manifestations of sexual dimorphism. Cows generally have longer horns with the horn casing being thicker and more compact towards the tips and extending further past the bony cores than in bulls or calves (Boessneck 1988, 69; Neff et al. 2016, 8; fig. 3.01). Bulls have shorter, thicker,
crescent-shaped horns with strongly formed bony cores (Boessneck 1988, 69; Neff et al. 2016, 10). Unlike cows, the horn casing of bulls is remarkably thin, and the bony core extends almost to the tip leaving only a short section of compacted horn (Neff et al. 2016, 10). In oxen, the effects of castration cause the horns to be much more longer and slender than in bulls (Boessneck 1988, 69).

Figure 3.01—Structure of Horn (Drawing by Johanna Probst; Neff et al. 2016, 8)

Within local breeding populations of wild aurochs in Europe, there were notable physical differences between males and females due to strong sexual dimorphism (Brewer et al. 1994, 80; Legge 2010, 28-29); bulls could reach a height of about 180 centimeters at the withers while cows would only reach about 150 centimeters (Legge 2010, 28). There were also significant
variations in horn size and horn shape (Clutton-Brock 1987, 64; Brewer et al. 1994, 80). These marked differences led early scholars to believe that there were two different forms of wild cattle, one large, *Bos primigenius*, and one small, *Bos longifrons* or *Bos brachyceros* (Clutton-Brock 1989, 201). As a result, different identifications were given to the same species (Legge 2010, 28).

In North Africa the same situation occurred where the larger aurochsen were identified as *Bos primigenius* and the smaller were identified as *Bos ibiricus* or *Bos africanus*, while in actual fact, both were *Bos primigenius* (Clutton-Brock 1989, 201). The last living aurochsen were known from Europe and became extinct around the seventeenth century (Brewer et al. 1994, 80).

Before presenting current theories of cattle domestication in north-east Africa, a series of events that may have preceded and led to cattle domestication will be discussed. It is suggested that constant supplies of water and salt encouraged aurochsen to gravitate and remain near human settlements (Clutton-Brock 1987, 67). The regular presence of cattle had profound effects on the local environment, mostly negative but some positive. The cattle would destroy the lower branches of trees, trample undergrowth, foul the water, destroy crops, and attract predators but they also helped open up the landscape and enlarge man-made clearings (Clutton-Brock 1987, 67-68). In order to reduce the negative effects of cattle on the local environment humans created enclosures in which the animals could be confined (Clutton-Brock 1987, 67-68). Naturally, smaller sized cattle would be easier to confine and maintain, perhaps one reason why domesticated cattle eventually decreased in size in comparison to their wild counterparts (Clutton-Brock 1987, 68). In general, a variety of physical changes may occur in wild animals during the process of domestication such as changes in body and brain size, alteration of external appearance, the gaining of a fat layer beneath the skin, and a reduction of the facial region all thought to be the result of increasing neoteny (O’Regan and Kitchener 2005, 216).

Currently there are three main archaeologically based models for cattle domestication in Egypt: the Wendorf and Schild model (1980), Andrew Smith’s model (2005), and Brass’s model (2007; Brass 2013, 68). The Wendorf and Schild model suggests that around the 9th millennium BC, controlled and managed indigenous aurochsen were brought from the Nile Valley to the
Nabta Playa-Bir Kiseiba region where they were subsequently domesticated (Brass 2013, 65; Gautier and Van Neer 2009, 40; Wendorf and Schild 1994). Andrew Smith proposed that domesticated cattle came to Egypt from the Near East via the Red Sea coast and then entered the Nile Valley (Smith 2005, 91). Finally, Brass’s model (2007) suggests that “incoming trickles” of domesticated cattle from the Middle East eventually made their way south to Nabta-Playa-Bir Kiseiba, and were interbred with controlled wild cattle in the Nabta Playa-Bir Kiseiba region (Brass 2013, 67-68). Brass’s model seems the most convincing because it appears to complement the available DNA evidence, which suggests that domestic Egyptian cattle had indigenous origins along with genetic input from Middle Eastern cattle (Brass 2013, 67). Unambiguous evidence of cattle domestication in Egypt dates to the 6th millennium BC and can be found at sites such as Fayum, Merimde, and Maadi (Van Neer 2010, 8; Rowland and Bertini 2016, 4-5). At these sites isolated and fragmented cattle bones were found indicating that they may have been food refuse (Van Neer 2010, 8; Rowland and Bertini 2016, 11).

3.2 Domesticated Cattle from Ancient Egypt

Descriptions of domesticated cattle by scholars (Andersson 1912, 146; Ghoneim 1977, 50-64; Brewer et al. 1994, 82-84; Osborn and Osbornová 1998, 195) from the Predynastic Period through the end of the Old Kingdom are typically divided into three categories based primarily on the horn size of the animal: long, short, and hornless. Although this classification method is problematic as discussed in the introduction, the review of the literature for the present study will follow the same organization in order to reflect the general ideas concerning cattle breeds in ancient Egypt. Each division will discuss proposed taxonomic classifications, physical descriptions of the animal, and suggested origin when applicable. Section 3.6 will discuss Egyptian words used to describe cattle from the specified time period.
3.3 Long-horned cattle

Scholars agree upon the existence of cattle with long horns from the Predynastic Period through the end of the Old Kingdom (Epstein 1971a, 192; Boessneck 1988, 69-70; Houlihan 1988, 11; Grigson 1991, 121 – 132; Brewer et al. 1994, 82-84; Osborn and Osbornová 1998, 195). Some scholars classify the ancient Egyptian longhorn as *Bos taurus primigenius* or *Bos taurus macroceros*, the latter of which is rarely used in modern literature, (Hartmann 1864, 25; Andersson 1912, 152; Epstein 1971, 189; Ghoneim 1977, 69; Boessneck 1992, 25; Houlihan 1996, 11; Osborn and Osbornová 1998, 194), while others classify it as *Bos taurus africanus* (Lortet and Gaillard 1903, 69; Montet 1954, 43; Gautier 1987, 175; Grigson 1991, 139; Van Neer 2010, 8-10), which is a more commonly used name.

It is accepted that long-horned cattle from the specified time period could have long, lyre-shaped horns or short, crescent-shaped horns (Andersson 1912, 147; Epstein 1971, 221; Boessneck 1988, 69; Brewer et al. 1994, 82-83; Osborn and Osbornová 1998, 195; Ghoneim 1977, 50; 69; fig. 3.02a-b). The differences in horn length and shape are believed to be the result of sexual dimorphism. Some scholars go further and describe variations of these horn shapes. For example, Hartmann describes lyre horns that do not flare out at the tips and appear parallel to each other (Hartmann 1864, 25; fig. 3.02c) and Zeuner describes double lyre-shaped horns (Zeuner 1963; Ghoneim 1977, 221; fig. 3.02d).
Figure 3.02 a. Lyre-shaped horns (Rahotep (mastaba 6), Meidum; Petrie 1892, pl. 9) b. Crescent-shaped horns (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 92) c. Horns that are more or less distant from one another (Mekhu and Sabni (A1), Qubbet el-Hawa; De Morgan 1894, 148) d. Double lyre-shaped horns (Atet (mastaba 16), Meidum; Petrie 1892, pl. 23)
Bos taurus primigenius are described as having short heads, wide foreheads, a nearly flat frontal area, and a straight intercornual ridge line (Epstein 1971, 189, 223; Ghoneim 1977, 50; fig. 3.03). They had large, prominent eyes, moderate-sized ears with long hairs attached to the ends, and broad muzzles with large nostrils (Epstein 1971, 221; Ghoneim 1977, 50). Egyptian cattle with long horns were large framed animals often reaching a height at the withers of 145 cm with a total body length of 170 cm (Epstein 1971, 221, 223 fig. 244; Ghoneim 1977, 50). These measurements were calculated from the anterior cranial length and generally correspond with the measurements of cattle in ancient Egyptian paintings (Epstein 1971, 221). They had a straight back behind their high withers, possessed short necks, small to moderate dewlaps, and deep chests (Epstein 1971, 221; Ghoneim 1977, 50; Grigson 1991, 122). Their thighs were generally

Figure 3.03-Cranium of an Apis bull (Bos taurus macroceros/primigenius) from Giza in Berlin, (Dürst 1899, pl. II fig. 2) (addition of intercornual ridge and least frontal breadth labels by author)
thin, except for fattened oxen, and the legs were short in relation to their bodies (Epstein 1971, 221; Ghoneim 1977, 50; Grigson 1991, 122).

The coats of cattle with long horns varied in color (Epstein 1971, 221; Ghoneim 1977, 54). A large majority of cattle had coats with a light colored base, such as white or yellow, with darker red or black spots (Ghoneim 1977, 54). Less frequently, some cattle would have a darker base color such as red or black, with light colored spots (Ghoneim 1977, 54). Some cattle were all red or all black, some were dark with a white topline and white underline, while others were spotted or brindled (Epstein 1971, 221; Ghoneim 1977, 54).

The other proposed taxonomical classification for ancient Egyptian long-horned cattle is *Bos taurus africanus* (Lortet and Gaillard 1903, 69; Montet 1954, 43; Gautier 1987, 175; Grigson 1991, 139; Van Neer 2010, 8-10). When the term *Bos taurus africanus* is used by Grigson and Van Neer, it refers to a distinct type of African cattle known as the Sanga, which can be found in modern-day Zambia, Angola, Botswana, southern Sudan, and Mozambique (Grigson 1991, 124; 126; Van Neer 2010, 8; fig. 3.04).

Figure 3.04- Sanga cattle (Grigson 1991, 121 fig. 1c)

Grigson proposes two scenarios for the origins of Sanga cattle. The first scenario maintains that the Sanga originated in Africa from the crossing of local wild cattle with imported taurine cattle coming from the Near East (Grigson 1991, 139). The second scenario proposes
that African domesticated cattle originated in Africa as Sargas, of which the Egyptian longhorn was one type (Grigson 1991, 139). The skull of the Sanga is long, parallel-sided, flat from side to side, and has a straight profile (Grigson 1991, 121-122). The horns are long and slender in large animals, but in general the horn size is in proportion to the size of the skull (Grigson 1991, 121-122). The horns protrude upwards from the skull diagonally and are often lyrate in cows and crescent-shaped in bulls (Grigson 1991, 121-122). Both sexes possess straight backs, but typically only the males possess a small muscular cervico-thoracic hump (Grigson 1991, 121-122). The dewlap is medium-sized and not folded, the rump is sometimes sloping, and the limb bones are long and slender for both sexes (Grigson 1991, 121-123; Van Neer 2010, 9). Both body and horn size vary within the species (Grigson 1991, 123).

Lortet and Gaillard claim that ancient Egyptian cattle were a member of the species *Bos africanus*, a classification that describes a type of bovine distinct from both taurines and Sanga cattle (Lortet and Gaillard 1903, 69; fig. 3.05a-b). They describe *Bos africanus* as having long horns directed according the plane of the forehead, long and slender limbs, and a hump at the withers (Lortet and Gaillard 1903, 51; 69). The authors note that there are some similarities between *Bos africanus* and Sanga cattle, but the latter differ from the former in that they are found in the valleys and plateaux of Abyssinia and they have short legs and an enormous development at the base of the horns (Lortet and Gaillard 1903, 69). Regarding the classification *Bos africanus* proposed by Lortet and Gaillard, Grigson states, “Although this is probably not a valid taxonomic category, the fact that they invoked it does emphasize the marked difference between Egyptian cattle, taurines, and Zebu” (Grigson 1991, 129).
3.4 Short-horned cattle

Cattle with shorthorns are the second major type of bovine from ancient Egypt that are described by scholars. The literature concerning short-horned cattle is contradictory. One scenario suggests that cattle with short horns were unrelated to domestic long-horned cattle, and are subsequently identified as *Bos taurus brachyceros* (Erman 1885, 580; Gaillard 1907, 33; Andersson 1912, 153; Epstein 1971, 288; Boessneck 1988, 70; Osborn and Osbornová 1998, 195).

Scholars believe that *Bos taurus brachyceros* may have been introduced into Egypt around the mid 3rd millennium B.C from Asia or Syria via the Isthmus of Suez (Epstein 1971, 288; Boessneck 1988, 70; Osborn and Osbornová 1998, 195), and/or they may have been introduced into Egypt from Libya (Montet 1954, 55-56). Evidence that is typically cited which supports the latter idea includes the Libyan Palette (CG 14238) and the 5th Dynasty funerary temple of Sahure located at Abusir (Montet 1954, 55-56). Using the Libyan Palette as evidence for the importation of short-horned cattle is problematic because the cattle depicted on the palette do not appear to have obviously short horns. On the other hand, the depiction of loot from Libya
in the funerary temple of Sahure does portray cattle with significantly shorter horns than other cattle that are depicted in the same temple (Borchardt 1913b, pl. 47).

The horns of *Bos taurus brachyceros* are described as short, markedly bent, crescent-shaped, and set close to the head (Epstein 1971, 192). *Bos taurus brachyceros* skulls typically possess an uneven forehead which is broad and square (Epstein 1971, 192 fig. 197, 193 fig. 198). The eye orbits are large, prominent, and lateral in direction (Epstein 1971, 192).

Longhorns, *Bos taurus primigenius*, and shorthorns, *Bos taurus brachyceros*, are distinguishable by differences in body size, the former typically larger than the latter, cranial conformation, and horn size (Epstein 1971, 189-192, 288; Ikram 1995, 25). Two conspicuous features that distinguish a brachyceros skull from a primigenius skull are its small size and small horns in comparison to the latter (Epstein 1971, 194). Also, the forehead of brachyceros is more square and sinuous compared to the flat forehead of the long-horned primigenius (Gaillard 1934, 29; Epstein 1971, 192).
The second scenario regarding the classification of cattle with short horns suggests that shorthorns were a subtype of the long-horned *Bos taurus primigenius* (Zeuner 1963; Epstein 1971, 221; Ghoneim 1977, 49). Some suggest that long-horned cattle may have developed shorter horns over a few generations after being moved from the desert into the wetter, cooler environments of the Nile Valley and the Delta (Brewer et al. 1994, 84; Osborn and Osbornová 1998, 195; Neff et al. 2016, 3). The authors who proposed this scenario based it on the observations of Hungarian cattle breeders who say that cattle with short horns grow long horns over a few generations after being moved from cooler, wetter environments to open, steppe environments (Brewer et al. 1994, 84). They assumed the reverse of this statement true in order to explain how long-horned cattle eventually developed short horns (Brewer et al. 1994, 84).

These cattle are described as having horns positioned far apart and protruding horizontally from the forehead (Ghoneim 1977, 60). The horns can range from slightly curved to very curved and are generally black (Ghoneim 1977, 60). They have a relatively large head, a slightly concave back, a small developed belly, long and slender legs, and a long tail with a large switch (Ghoneim 1977, 60).
One must consider the possibility that these first two scenarios happened simultaneously or at least overlapped at some point in time (Epstein 1971, 326; Brewer et al. 1994, 84; Osborn and Osbornová 1998, 195). Long-horned cattle may have developed short-horns over time due to environmental changes while a separate breed of short-horned cattle may have been imported from outside territories. Differences in postcranial features would help differentiate two types of short-horned cattle.

The final scenario suggests that there is no absolute proof for a breed of short-horned cattle in Egypt during this time (Grigson 1991, 130-132). Grigson believes that there is no published osteological evidence of a short-horned cattle population (1991, 130). This statement is largely founded on the work of Lortet and Gaillard (1903 and 1905) in which the authors claim that despite numerous depictions of short and medium-horned cattle, only longhorns were represented in the material that they examined (1903, 65; Grigson 1991, 130-132). One must wonder if Grigson considered the later work of Gaillard (1934) in which he claims to have discovered the remains of *Bos brachyceros* in Paleolithic deposits at Sebil-Komombo and at the Gerzean site of Toukh (Gaillard 1934, 33; Reed 1959, 1635).

3.5 Hornless Cattle

Prior to discussing hornless cattle in ancient Egypt, some terminology and basic genetic information about them must be presented. The words hornless and polled can both refer to cattle that are naturally hornless and also to horned animals that have been artificially dehorned (Ekarius 2008, 319). For this study the term hornless will be defined as a type of cattle that is naturally hornless and the word polled will describe cattle that have had their horns manually removed. Regardless of how the animals came to be hornless, raising cattle without horns was beneficial because horned cattle, when in groups, whether during transport or in loose housing, risk injuring each other due to fighting or accidental contact (Neff et al. 2016, 14).

The display of horns on cattle, or lack thereof, is determined by genetic inheritance (Long and Gregory 1978, 399). The gene that determines horn growth in cattle has two forms or alleles, hornless (H) and horned (h) (Phillips 2005, 1). The hornless form of the gene (H) is
dominant and the horned form of the gene (h) is recessive (Phillips 2005, 1). Cattle that have the genotype HH (true hornless) or Hh will display a hornless phenotype, while cattle with the genotype hh will be horned (Phillips 2005, 2). So, as long as one parent is true hornless (HH) the offspring will always be hornless. If both parents are heterozygous (Hh x Hh) there is a 75% chance that the offspring will be hornless and 25% chance it will be horned. If one parent is heterozygous (Hh) and the other is horned (hh) there is a 50% chance the animal will be horned and a 50% chance it will be hornless. Finally, if both parents are horned (hh x hh) the offspring will be horned (Phillips 2005, 2).

Another way to produce cattle without horns is to artificially dehorn them. Today it is ideal to perform this procedure before the calf is four weeks old (Neff et al. 2016, 14). Although there are no depictions of this procedure on ancient Egyptian monuments, it is most likely that the horns were either excised or cauterized with tools, possibly made from either flint or copper (Lortet and Gaillard 1907, 67; Andersson 1912, 152; Aston et al. 2000, 28; Ogden 2000, 167). Polledness by artificial removal of the horns does not affect the appearance of offspring as that is ultimately controlled by genetics. Selective breeding for the absence of horns would have been the ideal method for producing cattle without horns due to the pain and stress involved with artificial dehorning (Neff et al. 2016, 15).

Cattle without horns in ancient Egypt may have appeared as early as the Predynastic Period (Epstein 1971, 196), or later during the Old Kingdom (Brewer et al. 1994, 84; Osborn and Osbornová 1998, 195). Some scholars believe that hornless cattle in ancient Egypt were an independent breed (Erman 1885, 580; Andersson 1912, 164; Brewer et al. 1994, 84; Osborn and Osbornová 1998, 195), while others believe that they were a subtype of horned cattle (Epstein 1971, 196; Ghoneim 1977, 65-66; Boessneck 1988, 69-70). Both of these views are possible since today there are hornless breeds, including the Angus and Galloway, and hornless subtypes of horned breeds, including Polled Hereford and Polled Charolais (Schafberg and Swalve 2015, 55). In this study, all cattle without horns are assumed to be subtypes of horned cattle, because in
ancient Egyptian art hornless cattle exhibit the same post-cranial characteristics as their horned counterparts (Epstein 1971, 196).

3.6 Ancient Egyptian Words for Cattle

The ancient Egyptians had many words to describe and identify cattle (Appendix A). Whether any of these words were used specifically to identify a breed of cattle, or cattle from a certain origin, is difficult to ascertain for two reasons. First, it was common then, as it is now, to identify cattle by coat color, sex, or purpose. Second, determining the exact meaning of some words is difficult due to the fact that sometimes only a certain type or sex of cattle was used for a specific purpose. For example, oxen, castrated males, were used most often as sacrificial food animals (Ikram 1995, 14-15).

The four most frequent words used to describe the cattle from the Predynastic Period through the Old Kingdom: ng3w, iws, wnDw, and hry-db£. The first word, ng3w, variations ngs, ngw, ng, gn, gw, is said to describe a type of bovine with long horns that resembles wild aurochs (WB II, 348-349; Erman 1885, 580; Andersson 1912, 159; Brewer et al. 1994, 82-4; Ikram 1995, 14; Mastropaolo 2013, 68). Some scholars describe ng3w cattle as tall, lean, heavily muscled, and possessing of long horns, long legs, high withers and high shoulders (Montet 1954, 47; Ghoneim 1977, 70-74; Brewer et al. 1994, 82-84; Ikram 1995, 14). They are often pictured as beasts of labor and as free-range pasture animals (Montet 1954, 48, 50; Ghoneim 1977, 72, 74-75; Ikram 1995, 14). It has also been suggested that this word describes mature cattle, which are over four years old (Griffith 1898, 104; Ikram 1995, 14).

Another word often associated with long-horned cattle is iws, although its exact meaning is unclear (WB I, 49; Faulkner 1991,12). Some scholars use iws as a general term to describe cattle in ancient Egypt (Hartmann 1864, 25; Osborn and Osbornová 1998, 194), while others use it to describe cattle raised specifically for meat and sacrificial offerings (Ghoneim 1977, 70-73; Brewer et al. 1994, 82-85; Ikram 1995, 14). iws cattle associated with the latter definition are presumed to have been stabled and to have been fed a regimented diet, and as a result
appeared to have short legs and a very large stomach (Montet 1954, 43-44; Brewer et al. 1994, 82-85; Ikram 1995, 14; Mastropaolo 2013, 28).

The physical characteristics of ngzw and iwz seem to be generally agreed upon, but whether they were two separate breeds of cattle is not clear. According to Montet, ngzw and iwz were two unrelated types of cattle, which had different purposes (Montet 1954, 47, 55-56). He argues that ng were imported from Libya and were used for labor (Montet 1954, 55-56), while the iwz were imported to Egypt from the south and were sent directly to farms to be force fed until they were ready to be slaughtered (Montet 1954, 47). Other scholars use the word ngzw as a classification for long-horned cattle and the word iwz to describe ngzw cattle that were intended to be used for sacrificial offerings (Brewer et al. 1994, 84-85).

The main word that seems to be associated with short-horned cattle is wnḏw (WB I, 326; Mastropaolo 2013, 28). This word is used to describe cattle with naturally short horns (Faulkner 1991, 63; Brewer et al. 1994, 84) or cattle that have had their horns sawn to a short length (Andersson 1912, 159; Paton 1925, 4). Andersson states that wnḏw later included cattle that were subjected to artificial dehorning, although he does not specify when (Andersson 1912, 164).

Finally, the word most generally associated with cattle lacking horns is hry-ḏbr (WB III, 136; Lortet and Gaillard 1907, 62; Andersson 1912, 154; Ghoneim 1971, 76; Brewer et al 1994, 84; Mastropaolo 2013, 7), although its exact meaning is debated. Andersson suggests that hry-ḏbr refers to hornless cattle and wnḏw describes polled cattle (1912, 164). Some interpret hry-ḏbr as a word for calves (Montet 1925, 139; Mastropaolo 2013, 7), while others go further and argue that it describes calves undergoing a particular weaning method (Goedicke 1957, 161). It has also been proposed that cattle without horns are a derivative of iwz cattle, called iwzty (Montet 1954, 45). Thus, it is clear that there is a great deal of confusion and controversy in the terms used to identify different types of cattle.
3.7 Discussion

Trying to classify cattle into breeds according to their horn length is problematic because horn length varies within breeds based on age, sex, and diet, and, additionally, and the terms short and long are subjective. If ancient Egyptian domesticated cattle are to be separated according to our modern definition of breed, additional physical characteristics, such as general skull morphology, dewlap size, presence of a cervico-thoracic hump, back shape, tail length, switch shape, and coat color/s must be taken into account, together with textual evidence, which may suggest their origins.

The current interpretations of evidence, including depictions, text, and physical remains, suggest multiple scenarios about the domesticated cattle population from the Predynastic Period to the Old Kingdom (Appendix B). There may have been up to two different breeds of cattle with long horns, designated ng2w and iw3 (Montet 1954, 47, 55-56). It is also possible that there was only one breed of cattle with long horns and their role, either as a work or sacrificial animal, determined their physical characteristics (Ghoneim 1977, 69-70). For example, working animals would have been lean, whereas animals being destined for sacrifice would have been corpulent.

The situation concerning cattle with short horns is slightly more complicated. It is possible that one short-horned breed was imported to Egypt from the Syria/Palestine area (Epstein 1971, 288; Boessneck 1988, 70; Osborn and Osbornová 1998, 195) and another was imported from Libya (Montet 1954, 55-56; Houlihan 1996, 13), though there is no genetic testing available at this point to support either theory. There is also a reasonable chance that over time cattle with long horns developed short horns as a result of their environment (Brewer et al. 1994, 84; Osborn and Osbornová 1998, 195). Finally, some scholars discount the existence of short-horned cattle during this time period altogether (Grigson 1991, 130-132).

Cattle without horns could have been a variation, naturally or artificially, of an already established breed. Thus, it is possible that there was a type from a long-horned breed and a type from a short-horned breed (Epstein 1971, 221; Boessneck 1988, 69-70). Hopefully by re-
examining depictions, words, and physical remains of cattle, some clarity of understanding of the different types of cattle in ancient Egypt can be achieved.
Chapter 4: Representations of Cattle in Egyptian Art

4.1 Three-Dimensional Representations of Cattle (Appendix C)

Fifteen three-dimensional representations of cattle are included in this study; four are full body figurines, while 11 are only heads as the bodies are now missing. All objects date to the Predynastic Period. Due to the large number of heads and small number of bodies, more details have emerged in terms of cranial features, rather than post-cranial. Three horn phenotypes are apparent within this data set: short, crescent 1 horns (fig. 4.01a); short-long, crescent 2 horns (fig. 4.01b-c), and downward curving horns that are a subtype of crescent 2 horns (Schäfer 1896, 160, abb. 6). Horn length is an important feature to note, but it should be used with caution when trying to determine phenotypes as horn length is strongly determined by age and sex rather than breed, in some cases.

The most frequent horn phenotype is short, crescent 1-shaped horns, making up 47% of three-dimensional representations (figs. 4.01a, 4.02; pls. i-ii.c). Representations of these types of cattle, with a known provenance, are found in Lower and Middle Egypt (fig. 4.03). Forty-three percent of these cattle possess triangular faces; for the remainder, no face shape was identifiable (fig. 4.04). The horns of these cattle protrude both diagonally and horizontally from the skull (fig. 4.05). No representations of this type of cattle had a body and therefore, no post-cranial characteristics could be assessed.

The second most frequent horn phenotype is short to long, crescent 2-shaped horns, making up 46% of the total representations (figs. 4.01b-c, 4.02; pls. ii.d-iii.d). Representations of these cattle, with a known provenance, are found predominately in Middle and Upper Egypt (fig. 4.03). The majority of the faces are triangular in shape, and the horns protrude both horizontally and diagonally (figs. 4.04-4.05). The only bovine figurine that permits an analysis of post-cranial characteristics displays slightly prominent withers and no dewlap (pl. ii.e); as no genitalia are featured, sex cannot be determined.

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4 Due to the small sample size, these types of objects probably due not reflect the diversity of the cattle population in Egypt during this time period.
The final three-dimensional representation depicts a bovine with medium to long horns, found at el-Amrah. The shape of these horns could not be discerned due to the fact that the image shows a profile view (pl. iv.a). This example was included because it displays the full body in profile, which allows post-cranial characteristics to be easily observed. From the image, it seems that bovine has a medium to long neck, prominent withers, a slightly concave back, and a high hind-quarters. The sex and tail of the animal are not clearly visible.

Due to the small sample size, it is reasonable to assume that the patterns found in this dataset do not accurately reflect the range of the general cattle population of ancient Egypt in the Predynastic Period. It is possible that for these types of objects only specific breeds were chosen due to their meaning. Furthermore, issues of preservation skew the data. For example, clay figurines permit the separate application of long horns, but due to the horns’ thin and exposed nature, the chance of their intact survival is slim. Many cattle statuettes with medium to long horns were excluded from this study because neither horn was fully intact.

So, although the three-dimensional representations of cattle in this study probably do not reflect the diversity of the Predynastic Egypt’s cattle population, they show that cattle were represented in a variety of ways and mediums. There seems to be a high volume of cattle with short, shallow crescent (crescent 1) horns and short to long, deep incurved (crescent 2) horns. A discussion at the end of this chapter will combine this data with the information gathered from two-dimensional representations of cattle on objects and representations of cattle in tombs scenes in order to provide a broader picture of the cattle population during this time.
Figure 4.01 a. Short, crescent 1 horns (Matmar; Brunton 1948, pl. 22, 30) b. Short, crescent 2 horns (Abydos; Hendrickx 2002, 281 fig. 16.1a) c. Medium-long, crescent 2 horns (El-Amrah; EA35506 Photograph © Trustees of the British Museum) (www.britishmuseum.org)
Figure 4.02- Breakdown of horn phenotypes for 3D representations of cattle

Figure 4.03-Geographical distribution of horn phenotypes for 3D representations of cattle

Figure 4.04- Relationship between face shape and horn phenotypes for 3D representations of cattle

Figure 4.05-Relationship between horn protrusion angle and horn phenotypes for 3D representations of cattle
4.2 Two-Dimensional Representations of Cattle on Objects (Appendix D)

The sample size of two-dimensional representations of cattle on objects is 77. All material dates from the Predynastic Period through the First Dynasty. Five obvious phenotypes relating to the size and shape of the horns are found in this data set: short to long, crescent 1 horns, medium to long, crescent 2 horns, long to extra-long, lyre 1 horns, medium, lyre 2 horns, and short, v-shaped horns (fig. 4.06). In this data set all cattle, except four, are depicted with a complete body, permitting a more detailed analysis of post-cranial characteristics. For all cattle, no relationship between horn phenotypes and the shape of the face can be found, as the majority of face shapes are not clear enough to be determined (fig. 4.08). No cattle possess a visible dewlap.

The most frequent phenotype are cattle with short to long, crescent 1 horns, making up 51% of the total amount of cattle (figs. 4.06 & 4.12; pls. v-vii.a). Representations of this type of cattle are found in Middle and Upper Egypt (fig. 4.07). When the protrusion angle of the horns is visible, is it always diagonal (fig. 4.09). The withers are mostly not prominent and the backs, where surviving, are mostly straight (figs. 4.10 & 4.11). Of the tails that could be analyzed, about 72% were at or above the dewclaws and 17% were below the dewclaws. No colors were preserved on any representations for this kind of cattle. The sex of only one bovine was clear, showing it to be an ox (fig. 4.12e). These cattle generally do not appear muscular and are often found within enclosed spaces as can be seen in pls. v.a, v.c, vi.d-e.

The second most frequent phenotype are cattle with medium to long, crescent 2 horns, making up 40% of the total number of cattle (figs. 4.06 & 4.13; pls. vii-xii.a). Representations of these cattle are found throughout Egypt (fig. 4.07). The widespread distribution of this type of cattle may reflect the actual cattle population, or it may be due to the fact that this type of horn became the standard in Predynastic and Early Dynastic art (Hendrickx 2002, 279-280). The angle of protrusion for medium to long, crescent 2 horns can be either horizontal or diagonal (fig. 4.09). The wither height and shape of the back of this type of cattle vary. Thirty-five percent have prominent withers, while 45% do not (fig. 4.10). Sixty-five percent have straight backs, while 19% have slightly concave backs (fig. 4.11). Of the tails that could be analyzed, 42% are at or above
the dewclaws and 10% are below the dewclaws. Four bulls and one ox were able to be identified in this set. Three of the bulls are shown trampling a man, perhaps a representation of the king trampling his enemies (pls. ix.d, x.a, x.c). No color is preserved for any cattle of this type. Many of them are shown quite lean and muscular in comparison to the other types of cattle when pictured together, as seen on the Brooklyn Museum knife handle (pl. vii.a) and the Narmer Macehead (pl. xii.a). These cattle often seem to play an active role in a scene, such as trampling a human (pls. ix.d, x.a, x.c) or running (pl. xi.b).

The third most frequent phenotype are cattle with long to extra-long, lyre 1 horns, making up about 7% of the total amount of cattle (figs. 4.06 & 4.14; pls. xii.b-xiii.c). Representations of these cattle are found throughout Egypt (fig. 4.07). The horns of this type of cattle protrude either horizontally or diagonally (fig. 4.09). Two cattle appear to have prominent withers, and both appear to be oxen (fig. 4.14 a, c), while the remainder, whose sex is not identifiable, do not have prominent withers (fig 4.10). The majority of these cattle have straight backs (fig. 4.11). Out of the cattle that possess visible tails, 50% are at or above the dewclaws and 50% are below the dewclaws. One ox, on an ostracoon from the tomb of Hemaka, appears to have a light base coat with a few large black spots (fig. 4.14c).

The final two phenotypes, cattle with short, v-shaped horns and cattle with medium, lyre 2 horns each only have a sample size of 1 (fig. 4.06). The bovine with v-shaped horns does not display prominent withers and has a straight back and a short tail (fig. 4.15a; pl. xiii.d). The bovine with lyre 2 horns seems to have prominent withers and a tail that is at the dewclaws (fig. 4.15b; pl. vii.b)

Again, this information shows that cattle from the Predynastic Period through the First Dynasty were depicted in a variety of ways. The dataset for representations of cattle on objects includes additional horn phenotypes such as long to extra-long, lyre 1 horns, medium, lyre 2 horns, and short, v-shaped horns. There are examples of multiple phenotypes depicted on the same object (pls. vii.a-b, xii.a), which is useful because it provides a side-by-side comparison of different phenotypes depicted by the same hand.
Figure 4.06: Breakdown of horn phenotypes for 2D representations of cattle on objects

Figure 4.07: Geographical distribution of horn phenotypes for 2D representations of cattle on objects
Relationship Between Face Shape and Horn Phenotypes for 2D Representations of Cattle on Objects

Figure 4.08 - Relationship between face shape and horn phenotypes for 2D representations of cattle on objects

Relationship Between Horn Protrusion Angle and Horn Phenotypes for 2D Representations of Cattle on Objects

Figure 4.09 - Relationship between horn protrusion angle and horn phenotypes for 2D representations of cattle on objects

Wither Height of Cattle Represented on Objects

Figure 4.10 - Wither height of cattle represented on objects
Figure 4.11 - Back shape of cattle represented on objects

- short-long, crescent 1 horns
- medium-long, crescent 2
- long-extra long, lyre 1
- medium, lyre 2
- short, v-shaped

Legend:
- straight
- concave
- NA
Figure 4.12 a-e Examples of cattle with short to long, crescent 1 horns a. (Abydos; Petrie 1900, pl. 20, 15) Courtesy of Egyptian Exploration Society  
b. (Abydos; Petrie 1901, pl. 11, 1) Courtesy of Egyptian Exploration Society  
c. (Hierakonpolis; Capart 1905, 249 fig. 187) d. (Abydos; Petrie 1901, pl. 7, 8) Courtesy of Egyptian Exploration Society  
e. (Hierakonpolis; Quibell and Petrie 1900, pl. 12, 1) Courtesy of Egyptian Exploration Society

Figure 4.13 a-d Examples of cattle with medium-long, crescent 2 horns a. (Abydos; Dreyer 1998a, 67 abb. 46, j2/1) (German Archæological Institute, Cairo) b. (Hierakonpolis; https://en.wikipedia.org/wiki/Narmer_Palette#/media/File:Narmer_Palette.jpg) c. (Hierkonpolis; Capart 1905, 249 fig. 187) d. (Abydos; Petrie 1901, pl. 10, 2)  
Courtesy of Egyptian Exploration Society
Figure 4.14 a-d Examples of cattle with long to extra-long, lyre 1 horns a. (Naqada/Ballas; Petrie and Quibell 1896, pl. 51, 14) b. (Abydos; Petrie 1901, pl. 5, 1) Courtesy of Egyptian Exploration Society c. (Saqqara; Author’s photograph) d. (Sohag; Courtesy of the Phoebe A. Hearst Museum of Anthropology and the Regents of the University of California (Catalog No. 6-17633))
The analysis of cattle from tomb scenes throughout Egypt brings to light five distinct phenotypes of cattle, which may represent different breeds. Eight percent of the cattle from tomb scenes could not be assigned to any breed due to the fact that certain physical characteristics of the animal were not visible as a result of its position or poor preservation.

The first type of cattle, designated a, possess short, v-shaped horns and comprise roughly 1% of the cattle in the dataset (figs. 4.16-4.17; pl. xiv.a). These cattle appear to have small, dished faces, medium length necks, and moderately sized dewlaps. The preserved colors...
of these cattle suggest that their coats could be reddish/brown, black with white spots, or white with black spots. Only one scene from the dataset contained this type of cattle, coming from the tomb of Mereruka at Saqqara, showing cattle treading grain (fig. 4.17). Only the heads, necks, and dewlaps of these cattle are visible. These cattle, sometimes referred to as an orthoceros (straight horn) type, due to the unique upright position of their horns, have different cranial conformation from other long-horned breeds due to the upright direction of the horns on the skull (Epstein 1971, 197).
Figure 4.16-Geographical distribution of phenotypes for representations of cattle in tomb scenes
Figure 4.17-Examples of cattle with v-shaped horns (Mereruka, Saqqara; The Sakkarah Expedition 1938b, pls. 168-169) Courtesy of the Oriental Institute of the University of Chicago
The second type of cattle (b), have short to long, shallow crescent (crescent 1) horns and make up 2% of the cattle in this database (figs. 4.16, 4.18a-d; pls. xv-xvi.b). The bulls have short, shallow crescent horns that protrude diagonally from the skull, small heads, short necks, medium to large cervico-thoracic humps, small dewlaps, and concave backs (fig. 4.18a). The oxen have short to long, shallow crescent horns protruding diagonally from the skull, heads that are both small and proportionate to the body, short to medium necks, small cervico-thoracic humps, dewlaps that range from small to moderate, and straight backs (fig. 4.18b). The cows, based on two examples only, have long, shallow crescent horns that protrude diagonally from the skull, heads that are proportionate to the body, medium length necks, no cervico-thoracic hump, and straight backs (fig. 4.18c). The tail length of type b cattle seems generally seems to be at or above the dewclaws, and the switches have either a flat end or a round end. No conclusions about coat color for this type of cattle can be made due to poor color preservation, although, there are examples of oxen and cows that appear to have small spots on their coats, as seen in the tombs of Akhmerutnesut at Giza and Kaiemheset at Saqqara. Type b cattle are represented in tombs from Giza, Saqqara, Deshasha, Deir el-Gebrawi, and Qubbet el-Hawa and are found in a variety of scenes, including bull-fighting scenes, offering scenes, and agricultural scenes (fig. 4.16). One type b cattle appears in a scene from the tomb of Kaiemheset at Saqqara that depicts the siege of an occupied Asiatic residence from the southern Levant, which could support the theory that type b cattle originated in the Near East (fig. 4.18d; Mourad 2011, 136, 149).
The third type of cattle, c, has short to medium, lyre 2 horns and makes up 6% of the cattle in the database (figs. 4.16, 4.19a-b; xvi.c-xvii.d). No bulls of c type were found in this study and therefore cannot be described. The oxen and cows, however, both have short to medium, lyre 2 horns, generally protruding horizontally from the skull, small heads, short necks, small to medium cervico-thoracic humps, absent to moderate dewlaps, and low hind-quarters. The tail length varies from at or above the dewclaws to at or above the hocks, and the switch can have
either a round end or a flat end. No information about color patterns could be established due to poor preservation. Type c cattle are found in Giza, Abusir, Saqqara, Deshasha, and Tehna, and feature in inspection and agricultural scenes (fig. 4.16).

Figure 4.19- a. Oxen with short to medium, lyre 2 horns (Ptahhotep II (D 64), Saqqara; Quibell et al/ 1989, pl. 31) b. Cow with short to medium, lyre 2 horns (Inti, Deshassa; Kanawati and McFarlane 1993, pl. 33)

Grouping cattle according to this phenotype is generally straightforward except for one case: a group of cattle presented as loot from Libya from the funerary temple of Sahure (fig. 4.20). These cattle fit the above description in some aspects but not others. Their horns fall in the range of short to medium, and are mostly lyre 2- shaped, although some are flared just enough at the ends to be considered lyre 1- shaped. These cattle have heads that are more proportionate to their bodies than the cattle described above, smaller ears, and slightly higher hind-quarters,
which make the backs appear as having less dramatic slope than the cattle depicted in the tomb of Ptahhotep II (D64) at Saqqara (fig. 4.19a). Some of these perceived physical differences could be due to the fact that the animals were raised and fed differently. For example, the cattle depicted as loot from Libya may not have been confined to a stable and fattened for slaughter and, therefore, do not have a fat stomach that make their limbs appear short like the cattle depicted in the tomb of Ptahhotep II (D64) at Saqqara (fig. 4.19a). Finally, it must be considered that differences between certain physical characteristics could be the result of different artistic styles or what the state wants depicted. So, for now, the cattle from the funerary temple of Sahure are grouped together with type c cattle due to similarities in the horns and cervico-thoracic hump similarities.

![Figure 4.20](image)

**Figure 4.20**- Cattle presented as loot from Libya from the funerary temple of Sahure (Borchardt 1913b, pl. 1)

The three types of cattle described thus far, a (1%), b (2%), and c (6%), make up only 9% of the total amount of cattle from tomb scenes included in this study. The low frequency of representations for breeds a-c may be the result of poor preservation, or it may be an indication of their small population in Egypt. For example, the population of breed c may have been significantly smaller than other cattle breeds because they were imported from Libya.

It is proposed that the remaining 83% of the cattle can be divided into two groups, d and e. Identifying differences between the remaining 83% of the cattle in order to divide them into two groups proved challenging for multiple reasons. First, until now, assigning cattle into groups based on their physical characteristics has been relatively straightforward, as the size and shape
of their horns has been a clear distinguishing factor. The remaining 83% of the cattle all have medium to extra-long lyre 1 or lyre 2 horns, except for a few examples of bulls that have short to medium, crescent 2 horns. Since all of the oxen and cows have medium to extra-long, lyre horns, the initial division of the cattle began with the bulls. The bulls were divided into two groups: those with short to medium, crescent 2 horns and those with medium to extra-long, lyre horns (fig. 4.21a-b). It appeared that the bulls with short to medium, crescent 2 horns also had a large cervico-thoracic hump, while the bulls with long, lyre horns typically only had a small to medium cervico-thoracic hump (fig. 4.21a-b). These physical differences support the idea that there are at least two breeds within the remaining 83% of the cattle.

![Image](image1.png)

**Figure 4.21 - a.** Example of bulls with short to medium, crescent 2 horns (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 92) **b.** Bull with medium to extra-long, lyre horns (Iasen (G2196), Giza; Simpson 1980, fig 30) Photograph © Museum of Fine Arts, Boston

Deciding which of the above groups the remaining oxen and cows belong to was difficult. First, there is no apparent pattern of a certain type of bull mating or associated with a certain type of cow. For example, bulls with short to medium, crescent 2 horns are pictured with small cows that have medium, lyre horns and no cervico-thoracic hump (fig. 4.22a). The same bulls are also pictured with cows that have long to extra-long, lyre horns and a significant cervico-thoracic hump (fig. 4.22b). These observations are not surprising, and probably reflect the act of cross-breeding, which would have helped the ancient Egyptians produce cattle that was ideal for their needs, such as a meat, milk, or draft animal. Therefore, based on differences in certain post-cranial
characteristics, primarily the size of the cervico-thoracic hump and the height of the hind-quarters, it is proposed that oxen and cows with a medium to large cervico-thoracic hump and low hind-quarters may be from the same breed as the bulls with short to medium, crescent 2 horns. The short, crescent 2 horns of the bulls are the result of sexual dimorphism. The cows and oxen that lack a cervico-thoracic hump and have high hind-quarters may be the same breed as the bulls with long, lyre horns who also possess a small to medium cervico-thoracic hump and high hind-quarters. In this case, other physical characteristics such as horn length, limb length, dewlap size, tail length, and switch shape could not be used with confidence as differentiating characteristics. The length of the horns is strongly determined by age and sex, the length of the limbs and size of the dewlap can appear to change based on whether the animal is fat or slim, and finally, the length of the tail and switch shape do not appear to be distinguishing factors between breeds in this study. Therefore, it seems reasonable to propose, based on the presented evidence, that within the remaining cattle there are two different breeds, designated here as d and e.
Cattle breed d, makes up 30% of the total amount of cattle (fig. 4.16; xvii.e-xxix.f). The bulls have short to medium, deep crescent horns (crescent 2) protruding diagonally from the skull, small heads, short necks, significantly large cervico-thoracic humps, straight or concave backs, dewlaps that range from absent to small, lean bodies, and tails that fall at or above the dewclaws (fig. 4.23a). A few bulls retained traces of white and red color on their coats. The bulls belonging to this breed are depicted either fighting or mating.

The oxen possess medium to extra-long lyre horns that generally protrude diagonally from the skull (fig. 4.23b). The heads of the oxen can be either small or proportionate to their bodies, their cervico-thoracic humps are higher than their hind-quarters, and their backs can appear either concave or straight. Their dewlaps range from absent to moderate, their tails are usually at or above the dewclaws, and their switch ends are both flat and round. The oxen that have some color preserved, display coats of the following colors: white, red, or white with small and large black spots.

The cows possess long to extra-long, lyre horns that protrude diagonally from the skull and they generally have small heads (fig 4.23c). They have short to medium necks, small to medium cervico-thoracic humps, which are typically higher than their hind-quarters, concave backs, and dewlaps that range from absent to moderate. No conclusions about tail length or

Figure 4.22-a. Bull with short to medium, crescent 2 horns with small cow, displaying medium, lyre horns (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 92) b. Bull with short to medium, crescent 2 horns with cow that has long to extra-long, lyre horns (Ibi (8), Deir el-Gebrawi; Davies 1902, pl. 11) Courtesy of Egyptian Exploration Society
switch shape can be made due to the position of the tails and poor preservation. Only one cow from Hagarsa retains traces of color on its coat, which is red (Kanawati 1993, pl. 43). Examples of this potential breed of cattle are found in tombs throughout Egypt; from Giza, Abusir, Saqqara, Meidum, Deshasha, Meir, Deir el-Gebrawi, Hagarsa, el-Qasr wa 'l- Saiyad, Qift, and Qubbet el Hawa.

**Figure 4.23** a. Bull with short to medium, deep crescent horns (crescent 2) (Mery (C2) Hagarsa; Kanawati 1993, pl. 43) b. Hornless oxen, of the same breed as the bulls with short to medium, deep crescent horns (Rawer II (G 5470), Giza; Junker 1938, 233 fig. 48) c. Cow that is possibly the same breed as the bulls with short to medium, deep crescent horns (Ibi (8), Deir el-Gebrawi; Davies 1902, pl. 11) Courtesy of Egyptian Exploration Society

The final breed, e, makes up 53% of the total amount of cattle (fig. 4.16; pls. xxi.a-lvi). Representations of type e cattle depict the bulls with medium to long, lyre horns, which protrude diagonally from the skull (fig. 4.24a). The bulls typically possess heads that are proportionate to their bodies, short to medium necks, and absent to moderate dewlaps. These bulls, in contrast to the bulls with crescent horns, have small to medium cervico-thoracic humps and high hindquarters, causing their backs to appear more even than the sloping backs of type-d cattle. The tails of the bulls are at or above the dewclaws and their switches have both flat and round ends. Only one bull retained some color, which was red (Kanawati 2001, pl. 36). These types of bulls are found in tombs from Giza, Saqqara, Meir, Thebes, and Qubbet el-Hawa (fig. 4.16).

The oxen of this breed also display medium to extra-long, lyre horns, which protrude diagonally from the skull (fig. 4.24b). Their heads can be either small or proportionate to their
bodies, their neck length ranges from short to medium, and their dewlaps range from absent to moderate. They possess cervico-thoracic humps that range in size from absent to medium and they have high hind-quarters, making their back appear even. The area between their cervico-thoracic humps and their hind-quarters can be either straight or concave. The cows of this breed have the same characteristics as the oxen, except that they do not possess cervico-thoracic humps (fig. 4.24c). Some type e cattle are white with either red or black spots and are found in representations from Giza, Abusir, Saqqara, Meidum, Deshasha, Tehna, Meir, Deir el Gebrawi, Hagarsa, and Naga ed-Dër.

![Figure 4.24](image)

**Figure 4.24**  a. Bull with medium to long, lyre horns (Kaiemankh (G 4561), Giza; Kanawati 2001, pl. 36)  b. Ox with medium to extra-long, lyre horns (Nikauhathor, Giza; Hassan 1950, 175 fig. 167)  c. Cow with medium to extra-long, lyre horns (Seshemnefer: Ifi, Saqqara; Barsanti 1900, fig. 9)
<table>
<thead>
<tr>
<th>Breed A</th>
<th>Breed B</th>
<th>Breed C</th>
<th>Breed D</th>
<th>Breed E</th>
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</thead>
<tbody>
<tr>
<td>Bull</td>
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<td>NA</td>
<td>short to medium, deep crescent horns (crescent 2), small heads, short necks, significantly large cervico-thoracic humps, straight or concave backs, dewlaps that range from absent to small, lean bodies, and tails that fall at or above the dewclaws.</td>
<td>medium to long, lyre horns, heads that are proportionate to their bodies, short to medium necks, absent to moderate dewlaps, small to medium cervico-thoracic humps, and high hind-quarters.</td>
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</tr>
<tr>
<td>Ox</td>
<td>NA</td>
<td>short to long, shallow crescent horns, heads that are both small and proportionate to the body, short to medium necks, small cervico-thoracic humps, dewlaps that range from small to moderate, and straight backs.</td>
<td>short to medium, lyre 2 horns, small heads, short necks, small to medium cervico-thoracic humps, absent to moderate dewlaps, and low hind-quarters.</td>
<td>medium to extra-long lyre horns, heads small or proportionate to their bodies, cervico-thoracic humps are higher than their hind-quarters, their backs can appear either concave or straight, dewlaps range from absent to moderate.</td>
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69
<table>
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<th>Cow</th>
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<tr>
<td></td>
<td></td>
<td>long, shallow crescent horns, heads that are proportionate to the body, medium length necks, no cervico-thoracic hump, and straight backs</td>
<td>short to medium, lyre 2 horns, small heads, short necks, small to medium cervico-thoracic humps, absent to moderate dewlaps, and low hind-quarters</td>
<td>long to extra-long, lyre horns, small heads, short to medium necks, small to medium cervico-thoracic humps, which are typically higher than their hind-quarters, concave backs, and dewlaps that range from absent to moderate</td>
<td>medium to extra-long, lyre horns, heads small or proportionate to their bodies, neck length ranges from short to medium, dewlaps range from absent to moderate, and they have high hind-quarters</td>
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<tr>
<td></td>
<td>v-shaped horns, small, dished faces, medium length necks, and moderately sized dewlaps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>bulls, oxen, and cows all possess crescent 2 horns</td>
</tr>
</tbody>
</table>

**Figure 4.25**-Table of proposed breeds (a-f)
4.4 Discussion

The representations of cattle in this study depict seven horn phenotypes: short, v-shaped horns, short to long, crescent 1 horns, short to long, crescent 2 horns, medium to extra-long, lyre 1 horns, short to medium, lyre 2 horns, hornless cattle with flat heads, and hornless cattle with round heads. Hornless cattle are considered a subtype of horned breeds, and should be assigned to their respective breed by other post-cranial characteristics.

From the tomb scenes alone, five breeds of cattle, labeled a-e in Section 3.3, are apparent. Cattle breeds a-c are able to be initially distinguished by the shapes of their horns. Cattle from breed a have v-shaped horns, cattle from breed b have shallow crescent (crescent 1) horns, and cattle from breed c have lyre 2 horns. Cattle from breed d have bulls that display deep crescent (crescent 2) horns, and oxen and cows that display lyre horns. Cattle from breed e have bulls with medium to long, lyre horns and oxen and cows with lyre horns. A closer look at post-cranial characteristics was needed in order to properly classify oxen and cows into breeds d and e since they both possessed medium to long, lyre horns. Breed d oxen and cows typically have a small to medium cervico-thoracic hump and low hind-quarters, whereas breed e oxen and cows have almost no cervico-thoracic hump and high hind-quarters.

The other representations of cattle included in this study, three-dimensional and two-dimensional representations on objects, support the existence of the five proposed breeds mentioned above. There may also be evidence for an additional breed of cattle, assigned f, in which the bulls, oxen, and cows all possess crescent 2 horns. Possible representations of this breed of cattle are found in figure 4.26a-d. The existence of breed f is based on the assumption that the cattle in figure 4.26 do not represent bulls of breed d. Evidence of cows with crescent 2 horns may be found in figure 4.26b. This assumption is based on the fact that there are calves depicted with adult cattle, the latter of which would logically be cows. Figure 4.26c-d also do not seem to represent bulls, as the cattle lack cervico-thoracic humps, and their horns are quite long.
Figure 4.26—Possible representations of breed f: a. (Mahasna; Aryton and Loat 1911, pl. 14, 1) Courtesy of Egyptian Exploration Society b. (unknown provenance; Petrie 1920, pl. 18, 70) c. (Naqada/Ballas; Petrie and Quibell 1896, pl. 51, 15a) d. (Matmar; Brunton 1948, pl. 22, 2)
Chapter 5: Textual Evidence

Section 5.1 Textual Evidence Associated with Depictions of Cattle in Tomb Scenes

The words associated with depictions of cattle in tomb scenes from this study seem to describe characteristics such as the sex, age, or purpose of the animal, rather than the breed. For example, all bulls associated with a word from this study, regardless of breed, are labeled kA, which is generally agreed upon to mean bull (WB V, 94-95; Faulkner 1962, 283; Mastropaolo 2013, 8; Thesaurus Linguae Aegyptiae; fig. 5.01). Only one bull, or perhaps an ox with an intact scrotum, is labeled rn iw3, out of approximately 40 (bulls) or 600 (cattle) representations (fig. 5.02).

![Figure 5.01 - Words for bulls in tomb scenes](image)

Figure 5.01 - Words for bulls in tomb scenes

![Figure 5.02 - Bull labeled rn iw3 (Hetepherakhti (D60), Saqqara; Mohr 1943, fig. 4)](image)

Figure 5.02 - Bull labeled rn iw3 (Hetepherakhti (D60), Saqqara; Mohr 1943, fig. 4)
Six terms are used to describe the oxen within this study (fig. 5.03). The two most frequent terms, which describe the oxen of breeds C, D, and E, are *iw3* and *rn iw3*. The fact that these words describe multiple types, possibly breeds, of cattle, supports the suggestion that *iw3* and *rn iw3* (*rn* meaning young, Mastropaolo 2013, 70) do not describe a single breed of cattle as Montet’s theory suggests (Montet 1954, 47).

Determining the exact meaning of *iw3* and *rn iw3* is problematic. Some scholars suggest that *iw3* and *rn iw3* describe oxen that are raised for funerary offerings (Ghoneim 1977, 70-73; Brewer et al. 1994; Mastropaolo 2013, 28). This scenario is supported by the fact that corpulent oxen labeled *iw3* dominate offering scenes (fig. 5.04a). A contradiction to this theory presents itself in the form of lean and muscular cattle labeled *iw3* and *rn iw3* (fig. 5.04b-c). These cattle do not fit the ideal description of fattened, sacrificial cattle. The lean and muscular bodies of some *iw3* cattle may be evidence that they were also used as working animals, which perhaps suggests that the words *iw3* and *rn iw3* do not exclusively describe cattle raised for funerary offerings. Thus, the only idea that may be put forth from this limited data, is that *iw3* and *rn iw3* may be words that describe oxen in general.

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**Figure 5.03**-Words for oxen in tomb scenes
The second most common set of words that describe the oxen in this dataset are *ng* and *ng* *rn/* *rn* *ng* (fig. 5.03). These terms are found with depictions of cattle from breeds D and E, which supports the idea that *ng* and *ng* *rn/* *rn* *ng* do not describe a single breed of cattle. As with *iwA* and *rn* *iwA*, the exact meaning of *ng* is not clear. *Ng* cattle have been described as appearing similar to wild aurochsen; possessing tall, lean, heavily muscled bodies, long legs, high withers, and long horns (*WB* II, 348-349; Erman 1885, 580; Andersson 1912, 159; Brewer *et al.* 1994, 82-4; Ikram 1995, 14; Mastropaolo 2013, 68; fig. 5.05a-b). It has also been stated that *ng* cattle were used primarily as beasts of labor and/or were free-range pasture animals (Montet 1954, 48, 50; Ghoneim 1977, 72, 74-75; Ikram 1995, 14). While these descriptions accurately describe some *ng* cattle (fig. 5.05a-b), they do not accurately describe them all, as there are depictions of docile, corpulent *ng* cattle being presented as funerary offerings (fig. 5.06). The varying body types of *ng* cattle, both lean and corpulent, implies that cattle labeled *ng* could have been used for multiple
purposes, either as a working animal or a bovine intentionally fattened for slaughter. Therefore, it seems difficult to accept that ng exclusively refers to working and free-range cattle, as there are clearly fattened ng ready to be slaughtered.

Figure 5.05-Examples of lean and muscular ng cattle as described by scholars a. (Akhethotep (D64), Saqqara; Davies 1901, pl. 21) Courtesy of Egyptian Exploration Society b. (Iymery (G6020), Giza; Weeks 1994, fig. 29) Photograph © Museum of Fine Arts, Boston

Figure 5.06-Examples of corpulent ng cattle (Sekhemankhptah (G7152), Giza; Badaway 1976, fig. 20)

Iw3 and ng both seem to describe oxen that are lean (fig. 5.07a-b), and oxen that are corpulent (fig. 5.08a-b), and in some cases, recognizing any major differences between the two is difficult. On the other hand, there are instances when the differences between them are noticeable (figs. 5.09-5.10). For example, in figs. 5.09-5.10, the ng are taller, have longer horns, and are more muscular than the iws. The ng also appear to have more prominent withers than the iws, although, if the heads of the ng were fully erect like the iws's head, this difference might not
be as noticeable. One possible explanation for these differences, which would agree with an interpretation of \textit{ng} by Griffith, is that \textit{ng} cattle are more mature than \textit{iwz} cattle (1898, 104) in other words, at least four years of age or older (Silver 1969). This may explain the noticeably longer horns of the \textit{ng}, as the horns of cattle grow continuously throughout their lives (Neff et al. 2016, 4). A counter-argument to this hypothesis is that there are examples of cattle labeled \textit{ng rm}, in which \textit{rm} denotes an animal of a young age (Mastropaolo 2013, 70). Thus, it is not possible to determine the exact meanings of \textit{iwz} and \textit{ng} based on the labels used in iconographic scenes.

\textbf{Figure 5.07-a.} Example of lean and muscular \textit{ng} (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 82) \textbf{b.} Example of lean and muscular \textit{iwz} (Pepyankh the Black (A2), Meir; Kanawati 2014, pl. 82)
**Figure 5.08-a.** Example of corpulent *rn ng* (Sekhemankhptah (G7152), Giza; Badaway 1976, fig. 20)

**b.** Example of corpulent *rn iw3* (Akhethotep (D64), Saqqara; Davies 1901, pl. 21)

Courtesy of Egyptian Exploration Society

**Figure 5.09** *ng* and *rn iw3* cattle pictured together in an offering scene (Iymery (G6020), Giza; Weeks 1994, fig. 42) Photograph © Museum of Fine Arts, Boston

**Figure 5.10** *rn iw3* and *rn ng* cattle pictured together in an offering scene (Iymery (G6020), Giza; Weeks 1994, fig. 29) Photograph © Museum of Fine Arts, Boston

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Two words describe oxen without horns: \textit{iw\textst{t}} and \textit{hry-}\textit{db\textrs}\. \textit{Iw\textst{t}} describes hornless oxen from breeds D and E (fig. 5.03).\textsuperscript{5} They range in size from medium to large and are never depicted as calves (5.11a-b). With this limited amount of information, it may only be suggested that \textit{Iw\textst{t}} is a general term that describes adult oxen without horns, which agrees with Montet’s conclusions about the word (1954, 45).

\textbf{Figure 5.11}-Examples of oxen labeled \textit{Iw\textst{t}} a. Breed D (Rawer II (G5470), Giza; Junker 1938, 233 fig. 48) b. Breed E (Meresankh III (G7530), Giza; Dunham and Simpson 1974, fig. 4) Photograph © Museum of Fine Arts, Boston

\textit{Hry-}\textit{db\textrs} also describes hornless oxen from breeds D and E (fig. 5.03), except that they are generally depicted as calves, or at least, in a much smaller scale than other cattle depicted in the same scene (figs. 5.12-5.13). There are some exceptions in which \textit{hry-}\textit{db\textrs} cattle are depicted as nearly the same size as their horned counterparts (fig. 5.14). Thus, this term may have originally been used to denote calves undergoing a particular weaning method described by Goedicke (1957, 161), and as all calves are naturally hornless, \textit{hry-}\textit{db\textrs} may have later become a word that describes hornless cattle in general.

\textsuperscript{5} There is one example of a hornless cow labeled \textit{Iw\textst{t}} in this study (Mohr 1943, fig. 4). In this case \textit{iw3t} may be the feminine form of \textit{Iw\textst{t}} (Mastropaolo 2013, 6).
Finally, there are three words that describe cows in this study: \textit{hmt}, \textit{iws}, and \textit{mwmt bhs} (fig. 5.15). The word most frequently associated with female cattle is \textit{hmt}. This term describes cows from breeds D and E, and is generally translated as cow (\textit{WB} III, 76; Faulkner 1991,35; Mastropalo 2013, 6). The second most frequent term, found only with cows from breed E, is \textit{mwmt bhs}, which can be translated as “the mother of a calf”. Finally, there is one example of a cow labeled \textit{iws} from breed E (fig. 5.16). In this case, \textit{iws} may be the feminine form of the masculine \textit{iws} (Mastropalo 2013, 6), or it may mean hornless cattle as discussed above. Overall, it seems
that the words associated with cattle from tomb scenes do not relate to breed, but rather, describe the sex, age, or purpose of the animal.

**Figure 5.15**- Words for cows in tomb scenes

**Figure 5.16**- Example of cow labeled *iwst* (Hetepherakhti (D60), Saqqara; Mohr 1943, fig. 4)

**Section 5.2 Textual Evidence from Other Sources**

The intention of looking at other sources of text is to see if certain types of cattle originated from foreign lands. Words describing cattle from other sources must have phonetic elements in addition to a determinative so that the word is clearly discernable. This is important
because sometimes different words for cattle can have the same determinative. An example of this phenomenon can be seen in the tombs of Harkhuf and Pepynakht at Qubbet el-Hawa, in which $kz$ and $lwz$ have the same determinative (Sethe 1933, 127; 134). Unfortunately, many words describing cattle from sources in this time period consist of only a determinative, which makes the original word subject to speculation. Thus, the information that can be used from other primary sources is limited. Nonetheless, some observations can be made about text associated with cattle originating from lands south of Egypt and Libya.

Two words that refer to cattle from southern lands are $kz$ and $lwz$. The word $kz$ is found on the façade of the tomb of Harkhuf at Qubbet el-Hawa (De Morgan 1894, 162-173), and describes cattle that were given to him by the leader of southern lands (Strudwick 2005, 331; Sethe 1933, 127). The determinative associated with this word is a male bovine with medium to long, lyre horns (Sethe 1933, 127). The word $lwz$ is found in the tomb of Pepynakht, called Heqaib, at Qubbet el-Hawa (De Morgan 1894, 174-176), and it describes cattle that have been taken by force from Nubia (Strudwick 2005, 335; Sethe 1933, 134). The determinative for this word consists of three cattle with medium to long, lyre horns (Sethe 1933, 134). With this limited amount of information, it can only be said that there was more than one word to describe cattle from Nubia, including $kz$ and $lwz$.

No complete words for cattle originating from Libya were found, although, there is a reference to cattle being taken from Libya on the Palermo Stone (Strudwick 2005, 67; Sethe 1933, 237). There is also a scene from the funerary temple of Sahure, which depicts 123,440 cattle with short to medium lyre 2 horns, which form breed c in this study, being taken as loot from Libya (fig. 4.20) (Borchardt 1913b, pl. 1). Finally, no complete words were found that were associated with cattle coming from the Near East.
Chapter 6: Physical Remains of Cattle

The most telling information is derived from the physical remains of cattle that have been excavated and thus have a reliable provenance and chronological limit. There is one skull with v-shaped horns that is from Abadieh and dates to the Fourth Dynasty (Epstein 1971, 224, fig. 247). The horns protrude diagonally from the skull, the intercornual ridge line (region between the horns) is straight, the forehead appears square and flat, and the general shape of the skull is triangular. No measurements for this skull are available. This skull is evidence for the existence of proposed cattle breed a.

There are six examples of cattle with shallow crescent horns (crescent 1). The first is a cow from the E-94-1N tumulus at Nabta Playa (fig. 6.01). This tumulus is located toward the north end of the Nabta Playa Late Neolithic ceremonial complex and is believed to be the result of ritual activity (Applegate et al. 2001, 468). The horncores are short, slightly curved, and terminate in a slender point (Applegate et al. 2001, 471). The length of the outer curve of the horncores is about 15-16cm that according to the classification of Armitage and Clutton-Brock, corresponds to a medium horn length (1976, 331). This bovine stood around 125cm at the withers and was probably female (Applegate et al. 2001, 472). The cow died around the age of two and a half years (Applegate et al. 2001, 471).
The next example of a bovine with crescent 1 horns comes from tomb 3038 at Saqqara (fig. 6.02). This tomb possibly belongs to the high official Nebetka and may date to the reign of Anedjib from the First Dynasty (Rice 2003, 131; Van Dijk 2013, 453) The skull was buried in one of the niches of the superstructure (Emery 1949, 92; Van Dijk 2013, 453). From the image, it can be seen that the horns protrude diagonally from the skull and that face is a triangular shape. No measurements for this skull are available. The sex of the animal is assumed to be male, either a bull or an ox (Emery 1949, 92, pl. 27b; Van Dijk 2013, 449-450), but without an analysis of the horn cores or post-cranial bones, this cannot be proven (Armitage and Clutton-Brock 1976, 332).

Figure 6.01- Remains of cow with crescent 1 horns (Nabta Playa; Applegate et al. 2001, 470 fig. 15.1)
The third bovine with crescent 1 horns is from tomb 3504 at Saqqara (fig. 6.03). Tomb 3504 dates to the reign Djet and may have belonged to Djet’s royal treasurer, Sekhem-Ka (Rice 1999, 177; Van Dijk 2013, 451). Tomb 3504 possessed a low bench along its base, where there sat about 300 life-size bulls’ heads modelled from clay, in which real horns were inserted (Emery 1954, 7, pl. 6-7; Van Dijk 2013, 450). No measurements of the horns are provided in the publication, which makes suggestions of sex and age mere speculation. The only feature than can be observed from the image is that the horns protrude diagonally from the clay head.

**Figure 6.02** - Physical remains of bovine with crescent 1 horns (tomb 3038, Saqqara; Emery 1949, pl. 27b)
The next two examples of cattle with crescent 1 horns come from Hemamieh, near Badari (fig. 6.04a-b). These two sets of physical remains are among 13 carefully arranged piles of animal bones that were found slightly below the surface (Brunton and Caton-Thompson 1928, 91). It is estimated that these physical remains date to the end of the Old Kingdom (Brunton and Caton-Thompson 1928, 92). Each pile has parts of a disarticulated cattle skeleton, which is stacked with no apparent order except that the skull is always placed at the apex (Brunton and Caton-Thompson 1928, 91-92). Concerning the horns of pile 219, it is not clear from the publication if one horn was 15 inches long or if that was the length of both horns combined (fig. 6.04a). The length of the horn in pile 220 is 19 inches long (fig. 6.04b) (Brunton and Caton-Thompson 1928, 93).

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6 “Young bovine remains, in good condition, capped by the frontal bone with a pair of spreading horns 15 ins. long” (Brunton and Caton-Thompson 1928, 93).
The final example of cattle with crescent 1 horns comes from the tomb of Hetepheres (G 7000) at Giza (fig. 6.05). The skull, along with three leg bones, was wrapped in a reed mat and placed into a niche located in the west wall of the burial shaft as a shaft offering (Reisner and Smith 1955, 13; Ikram 2012, 363). The length of the horn is not recorded. These six examples of cattle with crescent 1 horns support the existence of proposed cattle breed b.

Figure 6.04- Physical remains of cattle with crescent 1 horns (Hemamieh; Brunton and Caton-Thompson 1928, pl. 68, 3, 5)

Figure 6.05- Physical remains of cattle with crescent 1 horns (Hetepheres, Giza; Reisner and Smith 1955, pl. 3b)
There are five examples of cattle with crescent 2 horns. The two earliest examples are from Naga ed-der and Hierakonpolis, both of which date to the Predynastic Period (figs. 6.06-6.07). At Naga ed-der, a single horn was found in burial N 7172 (fig. 6.06). The horn was found on the west side of the interred woman’s head (Lythgoe and Dunham 1965, 100). The horn appears rather short, but no measurements are provided in the publication.

At Hierakonpolis, a nearly undisturbed cow and calf burial was discovered in tomb 36 (fig. 6.07) (Van Neer 2010, 8-9). The cow’s horns appear to protrude horizontally from the skull, curve downwards, and terminate at the supraorbital ridge. The intercornual ridge line has two peaks, the forehead is flat and short, and the orbital bones are prominent. From the post-cranial bones it is suggested that the cow had slender extremities and that its height was around 128cm at the withers (Van Neer 2010, 8-9).

Figure 6.06- Crescent 2 horn (tomb 7172, Naga ed-Der; Lythgoe and Dunham 1965, fig. 41 d,e)
The next two examples of crescent 2 horns come from First Dynasty tomb 3504 at Saqqara (fig. 6.08). Real crescent 2 horns were inserted into clay bovine heads. Again, these skulls are part of a large group that surround mastaba 3504. The horns from both examples protrude diagonally from the skull. No measurements of the horns are provided in the publication.

Figure 6.07- Cow skull with crescent 2 horns (downward curving) (tomb 36, Hierakonpolis; Van Neer 2010, 9; photo by J. Rossiter) Courtesy of the Hierakonpolis Expedition

Figure 6.08- Clay bovine heads with real crescent 2 horns (tomb 3504, Saqqara; Emery 1954, pl. 7a)
   Courtesy of Egyptian Exploration Society
The final example of cattle with crescent 2 horns is a skull from Abydos, which dates to the Sixth Dynasty (fig. 6.09) (Pia 1941, 21). The exact context of the skull is not clear (Pia 1941, 21-22). The horns, which are 44cm long, protrude diagonally from the skull (Pia 1941, 34). The intercornual ridge line has two very small peaks, the forehead appears square and flat, and the overall shape of the skull is triangular. From the remains of cattle with crescent 2 horns, it may only be suggested that they are evidence for either bulls of breed d, the oxen and cows of which possess lyre horns due to sexual dimorphism, or bulls, oxen, and cows of breed f, in which all sexes possess crescent 2 horns.

![Skull with crescent 2 horns](image)

**Figure 6.09:** Skull with crescent 2 horns (Abydos; Pia 1941, 22 Abb. 4)

There are three examples of cattle with lyre 1 horns (fig. 6.10). All three examples come from First Dynasty tomb 3504 at Saqqara, where real horns were inserted into clay bovine heads. The horns in figure 6.10a-b protrude horizontally, while the horns in 6.10c protrude diagonally. These horns may correspond to oxen and cows of breed d or bulls, oxen, and cows of breed e.
Finally, there are two examples of cattle with lyre 2 horns. The first example comes from predynastic tomb N 7097 at Naga ed-der (fig. 6.11). The horns and the poll were found on the west side of an interred adult male (Lythgoe and Dunham 1965, 53-54). No measurements of the horns were provided in the publication, but from the image the horns seem to protrude horizontally from the skull.

**Figure 6.10**- Clay bovine heads with real lyre 1 horns (tomb 3504, Saqqara (left to right a, b, c); Emery 1954, pl. 7a) Courtesy of Egyptian Exploration Society

**Figure 6.11**- Lyre 2 horns (tomb N 7097, Naga ed-Der; Lythgoe and Dunham 1965, fig. 21a)
The second example of lyre 2 horns is a bucranium from tomb 3504 at Saqqara (fig. 6.12). This bucranium has a clay head with real horns inserted into the sides. It is part of the group of bucrania that surround mastaba 3504. In the image the horns appear to protrude horizontally from the clay head. No measurements of the horns are provided in the publication. The two examples of cattle with lyre 2 horns support the existence of cattle breed c.

Figure 6.12- Clay bovine head with lyre 2 horns (tomb 3504, Saqqara; Emery 1954, pl. 7a) Courtesy of Egyptian Exploration Society

Some physical remains of cattle from the Predynastic Period through the end of the Old Kingdom could not be included in this study for various reasons. For example, a bucranium found beneath the southern altar near the base of Djoser’s Step Pyramid were not included because the image did not provide a frontal view of the skull, which made the shape of the horns indiscernible (Firth et al. 1935b, pl. 73; Van Dijk 2013, 453), and the location of the actual remains are unknown to this author. There are also many food offerings of cattle from the Old Kingdom, including those from the tomb of Inty at Abusir, G 2000B, G 2100A, G 2381A, G 2381Z, G2385A, and Ankh-haf at Giza, and Shaft 46, Merefnebef’s funerary complex, and Seshemnefer’s chapel at West Saqqara, but these cannot be used in this study because they do not include complete horn cores (Ikram 2012, 364-369).
Although the physical remains of cattle presented in this study are limited, due to the preservation of material and the restrictions imposed by the author for this study, they confirm that cattle with different horn phenotypes existed from the Predynastic Period through the Old Kingdom. The different phenotypes may correspond to different breeds. The skull from Abadieh (Epstein 1971, 224, fig. 247) supports the existence of a breed of cattle with v-shaped horns, which is designated breed a in this study. There are six examples of cattle with crescent 1 horns (figs. 6.01-6.05). One is a cow, and the sex of the other five cannot be confirmed, although it is proposed that some of them are either oxen or bulls. If the cattle in figures 6.01-6.05 are a mixture of males and females, then the physical remains suggest that shallow crescent horns (crescent 1) are possibly a breed trait, and not the result of sexual dimorphism. These remains would then correspond to breed b in this study. There are five examples of cattle with crescent 2 horns (figs. 6.06-6.09). One is a female (fig. 6.07), while the sex of the others is not known. It may be suggested that these remains are evidence for either bulls of breed d, the oxen and cows of which possess lyre horns due to sexual dimorphism, or bulls, oxen, and cows of breed f, in which all sexes possess crescent 2 horns. There are three examples of cattle with lyre 1 horns (fig. 6.10). The sex of these remains cannot be determined and, therefore, may correspond to oxen and cows of breed d or bulls, oxen, and cows of breed e. Finally, there are two examples of cattle with lyre 2 horns, which correspond to breed c (figs. 6.11-6.12).
Chapter 7: Conclusion-Possible Cattle Breeds from the Predynastic Period through the end of the Old Kingdom

Representations and physical remains of domesticated cattle from the Predynastic Period through the end of the Old Kingdom show that these animals displayed marked physical variation. The current classification system of ancient Egyptian cattle groups them according to horn length: long, short, and hornless. There are multiple issues with this classification. First, the terms long and short are subjective, as they are not defined in Egyptian art when used to describe cattle horns. Also, most horn lengths of physical remains are not described using the method discussed in Armitage and Clutton-Brock (1976). Furthermore, this classification is over-simplified because it ignores causes of horn length variation such as sex, age, and genetics and it groups cattle according to one physical characteristic, rather than a combination of similar characteristics.

In this study, representations and physical remains of cattle were analyzed with the intention of grouping ancient Egyptian cattle from the Predynastic Period through the end of the Old Kingdom into breeds. It is proposed that there may have been six breeds of cattle during this time period, each defined by multiple physical characteristics. The representations of each breed of cattle span from the Predynastic Period through the end of the Old Kingdom, as can be seen below. The first breed of cattle, designated a, possess horns that protrude diagonally from the skull into a v-shape (fig. 7.01a-b). These cattle appear to have small, dished faces, medium length necks, and moderately sized dewlaps. The preserved colors of these cattle suggest that their coats could be reddish/brown, black with white spots, or white with black spots.
Cattle of breed \textbf{b} are initially identified by their short to long, shallow crescent (crescent 1) horns (fig. 7.02a-f). The bulls of breed \textbf{b} have short, shallow crescent horns that protrude diagonally from the skull, small heads, short necks, medium to large cervico-thoracic humps, small dewlaps, and concave backs (fig. 7.02a). The oxen have short to long, shallow crescent horns protruding diagonally from the skull, heads that are both small and proportionate to the body, short to medium necks, small cervico-thoracic humps, dewlaps that range from small to moderate, and straight backs (fig. 7.02b-c). The cows have long, shallow crescent horns that protrude diagonally from the skull, heads that are proportionate to the body, medium length necks, no cervico-thoracic hump, and straight backs (fig. 7.02d-e).
Cattle of breed **c** have short to long, lyre 2 horns (fig. 7.03a-e). No examples of bulls from breed **c** were found. The oxen and cows of breed **c** both have short to long, lyre 2 horns, generally protruding horizontally from the skull, small heads, short necks, small to medium cervico-thoracic humps, absent to moderate dewlaps, and low hind-quarters (fig. 7.03a-e.

**Figure 7.02** Examples of breed **b** a. Bulls (Iteti/Shehu, Deshasha; Kanawati and McFarlane 1993, pl. 51) b. Ox (Kaimheset, Saqqara; McFarlane 2004, pl. 48) c. Ox (Hierakonpolis; Quibell and Petrie 1900, pl. 12, 1) Courtesy of Egyptian Exploration Society d. Cow (Akhmerutnesut, Giza; Smith 1949, fig. 226c) e. Cow (Hierakonpolis; Capart 1905, 249 fig. 187) f. Bucranium (tomb 3038, Saqqara; Emery 1949, pl. 27b)
Cattle from breed d display marked sexual dimorphism. The bulls have short to medium, deep crescent horns (crescent 2) protruding diagonally or horizontally from the skull, small heads, short necks, significantly large cervico-thoracic humps, straight or concave backs, dewlaps that range from absent to small, lean bodies, and tails that fall at or above the dewclaws (fig. 7.04a-b).

Figure 7.03- Examples of breed c a. Ox (Sohag; Bénédite 1918b, 227 fig. 1) b. Cow (Inti, Deshasha; Kanawati and McFarlane 1993, pl. 33) c. Ox (Ptahhotep II (D 64), Saqqara; Quibell et al. 1989, pl. 31) d. Physical remains of horns (tomb N 7097, Naga ed-Der; Lythgoe and Dunham 1965, fig. 21a) e. Physical remains of horns (tomb 3504, Saqqara; Emery 1954, pl. 7a) Courtesy of Egyptian Exploration Society
The oxen possess medium to extra-long, lyre horns that generally protrude diagonally from the skull. The heads of the oxen can be either small or proportionate to their bodies, their cervico-thoracic humps are higher than their hindquarters, and their backs can appear either concave or straight. Their dewlaps range from absent to moderate, their tails are usually at or above the dewclaws, and their switch ends are both flat and round. The oxen that have some color preserved, display coats of the following colors: white, red, or white with small and large black spots (fig. 7.04c-d). The cows possess long to extra-long, lyre horns that protrude diagonally from the skull and they generally have small heads. They have short to medium necks, small to medium cervico-thoracic humps, which are typically higher than their hind-quarters, concave backs, and dewlaps that range from absent to moderate (fig. 7.04e) Cattle from breed d have coat colors of white, red, or white with small and large black spots.

Figure 7.04- Examples of breed d. a. Bulls (Mery (C2) Hagarsa; Kanawati 1993, pl. 43) b. Bull (Hierakonpolis; https://en.wikipedia.org/wiki/Narmer_Palette#/media/File:Narmer_Palette.jpg) c. Hornless oxen (Rawer II (G 5470), Giza; Junker 1938, 233 fig. 48) d. Ox (Naqada/Ballas; Petrie and Quibell 1896, pl. 51, 14) e. Cow (Ibi (8), Deir el-Gebrini; Davies 1902, pl. 11)

Courtesy of Egyptian Exploration Society

For breed e, the bulls have medium to long, lyre horns, which protrude diagonally from the skull (fig. 7.05a). The bulls typically possess heads that are proportionate to their bodies, short to medium necks, small to medium cervico-thoracic humps, absent to moderate dewlaps,
and high hind-quarters, causing their backs to appear even (fig. 7.05a). The oxen of breed e also display medium to extra-long, lyre horns, which protrude diagonally from the skull. Their heads can be either small or proportionate to their bodies, their neck length ranges from short to medium, and their dewlaps range from absent to moderate (fig. 7.05b). They possess cervico-thoracic humps that range in size from absent to medium and they have high hind-quarters, making their back appear even. The cows of breed e have the same characteristics as the oxen, except that they do not possess cervico-thoracic humps (fig. 7.05c). Cattle of breed e have red coats, white coats with red spots, or white coats with black spots.

![Image](image_url)

**Figure 7.05**- Examples of breed e a. Bull (Kaiemankh (G 4561), Giza; Kanawati 2001, pl. 36) b. Ox (Nikauhathor, Giza; Hassan 1950, 175 fig. 167) c. Cow (Seshemnefer: Ifi, Saqqara; Barsanti 1900, fig. 9)

Concerning breed f, it may only be stated that the bulls, oxen, and cows possess crescent 2 horns, their existence supported by representations of cattle on objects and physical remains (fig. 7.06a-b). The evidence in this study may be a more accurate reflection of the cattle population from Giza and Saqqara, since the bulk of the representations came from these locations.
No words were found to be associated with a single breed of cattle. The words most often associated with cattle from this time period, *ks, hmt, iws, ng, and hry-*db, describe characteristics such as sex, age, or purpose of the animal. *Ks* refers to an intact male, or a bull and *hmt* refers to a cow. Establishing a clear and concise definition for *iws* and *ng* is not possible with the information included in this study because each word seems to take on multiple meanings. *Hry-*db may have originally been used to describe calves undergoing a particular weaning method described by Goedicle (1957, 161), and as all calves are naturally hornless, *hry-*db may have later become a word that describes hornless cattle in general.

An additional goal of this study was to identify the origins of cattle with similar physical characteristics. Identifying an origin for a group of cattle with similar physical characteristics would add more credibility to their classification as a breed, as the classification of cattle based on geographical origin is largely in agreement with the breed clusters indicated by biochemical and molecular genetic analysis (Felius et al. 2011, 661). One method for finding the origins of cattle is looking at contemporary textual evidence in order to see if a specific type of cattle was imported.

**Figure 7.06** - Examples of breed **a.** Bucranium (tomb 36, Hierakonpolis; Van Neer 2010, 9; photo by J. Rossiter) Courtesy of the Hierakonpolis Expedition **b.** (Petrie 1920, pl. 18, 70)

*a.*

*b.*
to Egypt from a foreign land. Another method is to see if there are representations of cattle coming from foreign lands.

There is limited textual evidence regarding cattle from Nubia from this time period. From what exists at Qubbet el-Hawa, it can only be observed that two words describe cattle coming from the south; *k3* and *iws*. The determinatives for *k3* and *iws* in these texts are bovines with lyre-shaped horns. A text from the Palermo Stone describes cattle coming from Nubia, but only a determinative for cattle is present.

There is one reference to cattle coming to Egypt from Libya on the Palermo Stone, but the word only consists of a determinative, therefore, its original construction is not known. In addition to this textual evidence, there is a representation from the funerary temple of Sahure at Abusir, which depicts cattle being brought to Egypt from Libya. These cattle have lyre 2 horns, which form breed c in this study (fig. 7.07). This depiction is evidence that breed c possibly originated in Libya. Again, without genetic analysis this idea cannot be proven.

**Figure 7.07** - Cattle presented as loot from Libya from the funerary temple of Sahure (Borchardt 1913b, pl. 1)

There is no textual evidence of cattle coming to Egypt from the Near East, but it is likely that some cattle were brought from there into Egypt via trade and/or military missions, which are known to have taken place from the Late Predynastic Period onwards (Andelkovic 1995, 68-69; Wilkinson 1999, 131-133). There is a representation of a siege on an Asiatic town in the tomb of Kairemheset at Saqqara where cattle of two different phenotypes are being led into another location (fig. 7.08). The ox on the left corresponds to breed b and the ox on the right corresponds
to breed d. From this representation, it may only be suggested that these two breeds of cattle also existed in the Near East.

![Image](image_url)

**Figure 7.08** - Oxen from Asiatic siege scene (Kaiemheset, Saqqara; McFarlane 2004, pl. 48)

Multiple issues were encountered during this study. The most serious problem was the poor preservation of color on representations of cattle in tomb scenes, as coat colors are often a distinguishing breed characteristic. Another difficulty was trying to distinguish between physical characteristics influenced by breed and physical characteristics influenced by other factors such as age, sex, function, diet, or environment.

If time permitted, it would have been useful to investigate other types of tomb scenes, including agricultural scenes. It would also have been informative to extend the time period of this study into the First Intermediate Period and the Middle Kingdom, which would have provided more representations, textual evidence, and physical remains to further study ancient Egyptian cattle breeds.

The results of this study provide an insight into the trade and animal husbandry practices of the ancient Egyptians. It is highly probable that some ancient Egyptian cattle breeds from this time period originated from Nubia, Libya, and the Near East. There is evidence that breed c may have come from Libya and there is evidence that some cattle were brought to Egypt from Nubia during diplomatic and military missions. Additionally, although there is no evidence from this time period, it is likely that some cattle were brought from the Near East into Egypt via trade and/or
military missions, which are known to have taken place from the Late Predynastic Period onwards (Andelkovic 1995, 68-69; Wilkinson 1999, 131-133).

It is likely that the ancient Egyptians observed that each breed of cattle possessed its own strengths and weaknesses, and over time they learned which breeds were ideal for each industry. Farmers who raised dairy cattle preferred cows that had good feed efficiency and high milk output. Depending on the demand, dairy farmers could raise cows that produced either milk with a high butterfat content or milk with a high protein to fat ratio. Farmers that raised beef cattle may have preferred cattle that yielded fatter meat, which has a higher energy level and a more satisfying flavor (Briggs and Briggs 1980, 19). Cattle chosen to be draught animals needed to have sound dispositions and active, but controllable, temperaments.

In order to produce sound cattle that yielded good quality products, breeding programs must have been implemented. If the ancient Egyptians wanted to retain most characteristics of a certain breed, except maybe one or two, they may have produced new offspring by selective breeding. An example of this practice is breeding horned cattle for a hornless phenotype. Selective breeding for hornless cattle would retain important breed characteristics, while producing cattle that were less dangerous to people and other animals.

Finally, the ancient Egyptians probably discovered the benefits of crossbreeding, as it often produces stronger animals (Briggs and Briggs 1980, 29). Depending on the needs of the farmer or producer, crossbreeding could be used to improve traits such as adaptability, resilience against disease and pests, longevity, temperament, mature size, feed efficiency, the disposition of draft animals, and calving and mothering ability. It is highly probable that some of the proposed breeds from this study are the result of crossbreeding.

Thus, the existence of multiple cattle breeds from the Predynastic Period through the end of the Old Kingdom is likely considering that there were probably indigenous cattle breeds in addition to breeds brought to Egypt from foreign lands via trade and diplomatic/military missions. The ancient Egyptians probably understood the benefits of crossbreeding, which produced stronger cattle and could eventually lead to new and improved breeds tailored to the Egyptian’s environment and needs. Furthermore, we know that the ancient Egyptians had multiple dog
breeds, so cattle, which are far more crucial for survival and the economy, must surely have been bred for certain characteristics (Churcher 1993, 39).
### Appendix A- Terms describing cattle, excluding the names of bovine deities

<table>
<thead>
<tr>
<th>Hieroglyphs</th>
<th>Transliteration</th>
<th>Definition</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>sht</td>
<td>cow/ cow; found in some religious texts, associated with goddess “cow of the sky”</td>
<td><em>WB I, 12/ Mastropaolo 2013, 6</em></td>
</tr>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>sht</td>
<td>cow found in a title of Hathor from the Ptolemaic Period</td>
<td><em>WB I, 17/ Mastropaolo 2013, 6</em></td>
</tr>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>iws</td>
<td>cattle especially as sacrifice/ ox; long-horned cattle</td>
<td><em>WB I, 49/ Faulkner 1991, 12/ Mastropaolo 2013, 6</em></td>
</tr>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>iwst</td>
<td>feminine or collective of iws</td>
<td><em>WB I, 49/ Mastropaolo 2013, 6</em></td>
</tr>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>imnw</td>
<td>fighting bull</td>
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<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>iryt</td>
<td>milk cow</td>
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<td>cow</td>
<td><em>WB I, 117</em></td>
</tr>
<tr>
<td><img src="image" alt="Hieroglyph" /></td>
<td>ih</td>
<td>cattle/ bull</td>
<td><em>WB I, 119/ Faulkner 1991, 28/ Mastropaolo 2013, 6</em></td>
</tr>
<tr>
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<td>herd of cattle</td>
<td><em>WB I, 154/ Faulkner 1991, 35</em></td>
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<tr>
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<td>cow of Hathor (Ptolemaic Period)</td>
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<td>wnm</td>
<td>masttier?/fattened ox</td>
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<tr>
<td>Sign</td>
<td>Description</td>
<td>Reference</td>
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<td></td>
</tr>
<tr>
<td>wr</td>
<td>bull</td>
<td>WB I, 331/ Mastropolo 2013, 7</td>
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</table>
| wrt          | sacred cow                           | WB I, 331/ Faulkner 1991, 64/  
|              |                                    | Mastropolo 2013, 7             |
| wšb          | fighting bull /bull                  | WB I, 373/Faulkner 1991, 70/  
|              |                                    | Mastropolo 2013, 7             |
| wšbt         | feminine form of wšb                 | Mastropolo 2013, 7             |
| wgw          | free wandering (range) cattle (Ikram  | WB I, 398/Faulkner 1991, 74    |
|              | 1995, 15) /misreading of hww 'cattle' |                                |
| bhs          | calf/calf                            | WB I, 469/Faulkner 1991, 84/  
|              |                                    | Mastropolo 2013, 7             |
| bkst         | pregnant cow                         | WB I, 481/Mastropolo 2013, 7   |
| pry          | fighting bull/ferocious bull         | WB I, 526/Faulkner 1991, 91/  
|              |                                    | Mastropolo 2013, 7             |
| pdšt          | cattle                               | WB I, 569/ Mastropolo 2013, 7  |
| mšt          | milk cow/milk cow                    | WB II, 78/ Faulkner 1991, 108/  
|              |                                    | Mastropolo 2013, 7             |
| mmnmt        | herd of cattle/ cattle               | WB II, 81/Faulkner 1991, 109/  
|              |                                    | Mastropolo 2013, 7             |
| mrw          | bulls                                | Faulkner 1991, 111/            
|              |                                    | Mastropolo 2013, 7             |
| mrt          | black cow                            | WB II, 106/ Mastropolo 2013, 7 |
| mry          | fighting bulls /fighting bulls       | WB II, 106/ Faulkner 1991, 112/  
|              |                                    | Mastropolo 2013, 7             |
| mhīt         | milk cow/milk cow                    | WB II, 113/Faulkner 1991, 113/  
<p>|              |                                    | Mastropolo 2013, 7             |</p>
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<th>Translation</th>
<th>Reference</th>
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<td>calf/cow that gives birth</td>
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<tr>
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<td>mqt</td>
<td>stalled cattle/stalled cattle</td>
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<td><img src="image4.png" alt="Image" /></td>
<td>nfrt</td>
<td>cows/cattle</td>
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<td><img src="image5.png" alt="Image" /></td>
<td>nhbw</td>
<td>yoke-oxen</td>
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<tr>
<td><img src="image6.png" alt="Image" /></td>
<td>ng/ngw/gn/gw</td>
<td>long-horned cattle with multiple uses including work and sacrifice /long-horned bull or ox</td>
<td>WB II, 348-349/Faulkner 1991, 141/ Mastropaolo 2013, 8</td>
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<td><img src="image7.png" alt="Image" /></td>
<td>rny</td>
<td>calf/calf</td>
<td>WB II, 429/Faulkner 1991, 150/ Mastropaolo 2013, 7</td>
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<td><img src="image8.png" alt="Image" /></td>
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<td><img src="image9.png" alt="Image" /></td>
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<td>cows of Hathor (Edfu)</td>
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<td><img src="image10.png" alt="Image" /></td>
<td>hww</td>
<td>fighting bulls /class? Of bulls</td>
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<td><img src="image11.png" alt="Image" /></td>
<td>hmt</td>
<td>see idt, cow</td>
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<td><img src="image12.png" alt="Image" /></td>
<td>hry- dbr</td>
<td>hornless/calf, docile</td>
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<td><img src="image13.png" alt="Image" /></td>
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<td>kind of cattle/kind of cattle</td>
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<td><img src="image14.png" alt="Image" /></td>
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<td>Hieroglyph</td>
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<td>htmw</td>
<td>cattle</td>
<td>Faulkner 1991, 199</td>
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<tr>
<td>ss</td>
<td>ox</td>
<td>Mastropolo 2013, 7</td>
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<td>ssb</td>
<td>piebald calf/dappled calf</td>
<td>WB IV, 17/ Faulkner 1991, 210</td>
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<tr>
<td>ssbt</td>
<td>colorful cow/dappled cow</td>
<td>WB IV, 18/ Faulkner 1991, 210/ Mastropolo 2013, 7</td>
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<td>sbnt</td>
<td>cow in suck</td>
<td>WB IV, 90/ Faulkner 1991, 220/ Mastropolo 2013, 8</td>
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<tr>
<td>sms/smz?</td>
<td>wild bull/wild bull</td>
<td>WB IV, 124/ Faulkner 1991, 226/ Mastropolo 2013, 8</td>
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<td>smst</td>
<td>wild cow/wild cow</td>
<td>WB IV, 124/ Faulkner 1991, 226/ Mastropolo 2013, 8</td>
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<tr>
<td>shtyw</td>
<td>cattle/class of cattle</td>
<td>WB IV, 231/ Faulkner 1991, 240/ Mastropolo 2013, 8</td>
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<td>sks</td>
<td>plough-animal/plough-ox</td>
<td>WB IV, 316/ Faulkner 1991, 251/ Mastropolo 2013, 8</td>
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<td>sbn</td>
<td>male and female cattle/mixed cattle</td>
<td>WB IV, 441/ Faulkner 1991, 264/ Mastropolo 2013, 8</td>
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<tr>
<td>ks</td>
<td>bull/bull</td>
<td>WB V, 94-95/ Faulkner 1991, 283/ Mastropolo 2013, 8</td>
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<tr>
<td>knt</td>
<td>black bovine/black bovine</td>
<td>WB V, 125/ Mastropolo 2013, 8</td>
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<td>tpiw</td>
<td>ox</td>
<td>Faulkner 1991, 298/ Mastropolo 2013, 8</td>
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<td>tntt</td>
<td>sacred cows/sacred cattle</td>
<td>WB V, 376/ Faulkner 1991, 306/ Mastropolo 2013, 8</td>
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<tr>
<td>Term</td>
<td>Description</td>
<td>Reference</td>
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<td></td>
</tr>
<tr>
<td>$d�示$</td>
<td>red bovine</td>
<td><em>WB</em> V, 488/ Mastropaolo 2013, 8</td>
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</tbody>
</table>
Appendix B- Possible scenarios of the domesticated cattle population in Egypt from the Predynastic Period through the Old Kingdom

Breeds of cattle with long horns

1 breed of long-horned cattle, possibly *Bos taurus primigenius*, descended from wild Egyptian aurochs (assuming the Wendel and Schild (1980) model of domestication)

1 breed of long-horned cattle, possibly *Bos taurus primigenius*, descended from cattle that were the result of interbreeding wild Egyptian aurochs with domesticated cattle from the Middle East (assuming Brass 2007 model of domestication)

Two separate breeds of long-horned cattle imported from outside Egypt

Breeds of cattle with short horns

Short-horned variation of long-horned *Bos taurus primigenius* - due to environmental factors

Short-horned breed imported from Libya

Short-horned breed imported from Syria/Asia - possibly *Bos taurus brachyceros*

An independent breed of short-horned cattle did not exist

Breeds of cattle without horns

Hornless or polled variation of long-horned *Bos taurus primigenius*

Hornless or polled variation of short-horned breed imported from Libya

Hornless or polled variation of short-horned breed imported from Syria/Asia
## Appendix C- Three-dimensional representations of cattle

<table>
<thead>
<tr>
<th>Museum Number</th>
<th>Date</th>
<th>Provenance</th>
<th>Material</th>
<th>Horn Shape</th>
<th>Angle of Protrusion</th>
<th>Withers</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Color</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Das Ägyptische Museum, Berlin</td>
<td>(Priece 1991, pl. 5)</td>
<td>Naqada I</td>
<td>clay</td>
<td>medium-long</td>
<td>crescent</td>
<td>NA</td>
<td>NA</td>
<td>standing</td>
<td>profile view of figurine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>(Randall-MacIver and Mace 1902, pl. 9, fig. 2)</td>
<td>El-Amrah funerary</td>
<td>clay</td>
<td>medium-long</td>
<td>NA</td>
<td>diagonal profile</td>
<td>absent to small prominent concave</td>
<td>standing</td>
<td>profile view of figurine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The British Museum, London</td>
<td>(Eiwanger 1992, Tafel 89, V.199)</td>
<td>El-Amrah funerary</td>
<td>clay</td>
<td>medium-long</td>
<td>crescent</td>
<td>horizontal</td>
<td>absent to small prominent concave</td>
<td>only two out of four cattle can be analyzed (right proper side)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Museum of Archaeology and Anthropology, Cambridge</td>
<td>(Eiwanger 1992, Tafel 89, V.199)</td>
<td>Merimda Bani Salah</td>
<td>red</td>
<td>short</td>
<td>downwar</td>
<td>No</td>
<td>No</td>
<td>recumbent</td>
<td>NA</td>
<td></td>
<td></td>
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<tr>
<td>The Petrie Museum of Egyptian Archaeology, UCL</td>
<td>(Brunton 1927, pl. 17)</td>
<td>Naqada III</td>
<td>black</td>
<td>short</td>
<td>crescent</td>
<td>horizontal</td>
<td>NA</td>
<td>NA</td>
<td>black</td>
<td>head only</td>
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<td>Naturalistic Bovine Heads</td>
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111
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<th>Horn size</th>
<th>Horn Shape</th>
<th>Angle of Protrusion</th>
<th>General Skull Morphology</th>
<th>Develop</th>
<th>Withers</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Color</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>NA NA</td>
<td>(Petrie et al. 1912, pl. 5, 205) Naqada II-III (Hendrickx 2002, 307) limestone</td>
<td>Gerza</td>
<td>funerary tomb 205</td>
<td>NA</td>
<td>short</td>
<td>crescent 1</td>
<td>NA</td>
<td>triangular face</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
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<td>NA</td>
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<td>NA</td>
<td>NA</td>
<td>head only/part of bracelet or necklace</td>
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<td>Das Ägyptische Museum, Berlin</td>
<td>AM13810</td>
<td>Photograph © Trustees of the British Museum, (<a href="http://www.britishmuseum.org">www.britishmuseum.org</a>) Naqada</td>
<td>pottery</td>
<td>Naqada</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>short</td>
<td>downwar d curving horns</td>
<td>diagonal</td>
<td>triangular face</td>
<td>NA</td>
<td>NA</td>
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<td>NA NA</td>
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<td>NA</td>
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<td>NA</td>
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<td>assuming adult bovine and assuming horns are intact - very short horns</td>
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<td>matmar</td>
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<td>crescent 1</td>
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<td>triangular face</td>
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<td>Double bull's head amulet</td>
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<td>Royal Museums for Art and History, Brussels</td>
<td>E3381a</td>
<td>(Hendrickx 2002, 281 fig. 16.1a) &quot;prehistoric&quot; (Price 1900, 160) ivory</td>
<td>Abydos?</td>
<td>ivory</td>
<td>NA</td>
<td>NA</td>
<td>0.39</td>
<td>short</td>
<td>crescent 2</td>
<td>diagonal</td>
<td>parallel shaped face</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
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<th>Context (Specific)</th>
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<th>Horn size</th>
<th>Horn Shape</th>
<th>Angle of Protrusion</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Withers</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Color</th>
<th>Sex</th>
<th>Textual Evidence</th>
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<td>EA32124</td>
<td>[Capart 1905, fig. 115;The British Museum, Photograph © Trustees of the British Museum, (<a href="http://www.britishmuseum.org">www.britishmuseum.org</a>); Patch et al. 2011, 24]</td>
<td>Naqada II (Patch et al. 2011, 25)</td>
<td>flint</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.71</td>
<td>medium</td>
<td>crescent</td>
<td>2</td>
<td>diagonal</td>
<td>trianular shaped face</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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### Appendix D- Two-dimensional representations of cattle on objects

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<th>Context (Specific)</th>
<th>X</th>
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<th>Dowlap Size</th>
<th>Back Shape</th>
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<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity</th>
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<tr>
<td>White Cross-lined pottery (Naqada I)</td>
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<tr>
<td>The British Museum, London</td>
<td>EA49025</td>
<td>(Ayrton and Lot 1911, pl. 14, 1)</td>
<td>Naqada I</td>
<td>clay</td>
<td>Mahasna</td>
<td>funerary</td>
<td>grave H-97</td>
<td>NA</td>
<td>long</td>
<td>crescent 1/2</td>
<td>diagonal</td>
<td>NA</td>
<td>absent to small</td>
<td>promine nt</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>The Petrie Museum of Egyptian Archaeology, UCL</td>
<td>UC15335</td>
<td>(Petrie 1920, pl. 18, 75)</td>
<td>Naqada I</td>
<td>clay</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>all-medium (5)</td>
<td>all-crescent 1/2</td>
<td>all-diagonal</td>
<td>NA</td>
<td>all-absent to small</td>
<td>all-not prominent</td>
<td>all-straight</td>
<td>all-at or above dewclaws</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Wavy-Handled Jars (Naqada III)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>possibly five adult cattle and two calves based on size; two calves will not be included</td>
</tr>
<tr>
<td>Phoebe A. Hearst Museum of Anthropology, University of California Berkeley</td>
<td>6-17633</td>
<td>(Patch et al. 2011, 22)</td>
<td>Naqada II-III</td>
<td>pottery</td>
<td>Sohag</td>
<td>funerary</td>
<td>Tomb 76</td>
<td>2</td>
<td>extra long</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>parallel face</td>
<td>absent to small</td>
<td>not prominent</td>
<td>straight</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>NA</td>
<td>NA</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>head on standard; feather between horns</td>
</tr>
<tr>
<td>Museum</td>
<td>Museum Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Material</td>
<td>Provenance</td>
<td>General Skull Morphology</td>
<td>General Evidence Activity</td>
<td>Notes</td>
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<tr>
<td>NA</td>
<td>NA</td>
<td>(Dreyer 1998a, 68 abb.: 48, iS/2)</td>
<td>Naqada III pottery</td>
<td>Abbydos</td>
<td>funerary tomb U-j</td>
<td>crescent 12</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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Graffiti on Pottery

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<th>Provenance</th>
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<th>General Evidence Activity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>(Petrie and Mace 1901, pl. 20, 28)</td>
<td>predynastic pottery</td>
<td>Hu</td>
<td>funerary cemetery U</td>
<td>crescent 12</td>
<td>diagonal</td>
<td>NA</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>(Quibell 1907, 49 fig. 5)</td>
<td>predynastic pottery</td>
<td>Asfut el-Mata’na</td>
<td>funerary cemetery</td>
<td>1.9</td>
<td>extra long</td>
<td>lyre 1</td>
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<td>NA</td>
<td>NA</td>
<td>(Brunton 1948, pl. 22, 2)</td>
<td>predynastic pottery</td>
<td>Matmar</td>
<td>grave 2848</td>
<td>1</td>
<td>medium</td>
<td>crescent 12</td>
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<td>NA</td>
<td>NA</td>
<td>(Petrie and Quibell 1896, pl. 51, 14)</td>
<td>predynastic pottery</td>
<td>Naqada/Ballas</td>
<td>NA</td>
<td>NA</td>
<td>1.4</td>
<td>extra long</td>
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<td>NA</td>
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<td>Naqada/Ballas</td>
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<td>NA</td>
<td>1.3</td>
<td>long</td>
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<td>NA</td>
<td>(Adams 2000, pl 48a)</td>
<td>predynastic pottery</td>
<td>Hierakonpolis</td>
<td>funerary Locality 6 Tomb 6</td>
<td>NA</td>
<td>short</td>
<td>v-shaped</td>
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Palettes

The Museum of Egyptian Antiquities or ÇE (2018) | CG14716 | Naqada III | Hierakonpolis | Main Deposit | NA | crescent 12 | horizontal | NA | absent to small | not prominent | concave | at or above dews la ws | flat end | NA | bull | NA | tramplin g man | NA |
| Louvre, Paris | E11255 | Hierakonpolis | Naqada Ill | siltstone | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | bull | NA | tramplin g man | NA | * bucra na, or else rams' skulls, * (Quibell 1900, 7) bucrania on palace or enclosure wall of temple (Hendrickx 2002, 280)
<table>
<thead>
<tr>
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<th>Museum Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Material</th>
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<th>Context (Specific)</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Angle of Protrusion</th>
<th>Morphology</th>
<th>Dewlap Size</th>
<th>Withers</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Color</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity</th>
<th>Notes</th>
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<td>© Musée du Louvre/C. Décamps</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>crescent</td>
<td>medium t 2</td>
<td>NA</td>
<td>straight</td>
<td>NA</td>
<td>concav  e</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>bull</td>
<td>NA</td>
<td>tramplin g man</td>
<td></td>
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<td>Ostraka</td>
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<td>Naqada III</td>
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<td>NA</td>
<td>SA</td>
<td>Saqqara</td>
<td>Funerary</td>
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<td>long extra long</td>
<td>profile of face slightly convex</td>
<td>absent to small</td>
<td>promine nt</td>
<td>concav  e</td>
<td>at or above dewclaws</td>
<td>NA</td>
<td>small and large black spots</td>
<td>ox</td>
<td>NA</td>
<td>walking</td>
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<td>The Ashmolean Museum of Art and Archaeology, Oxford</td>
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<td>(Quibell 1900, pl. 26b; Capart 1905, 249 fig. 187)</td>
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<td>Naqada III</td>
<td>Hierakonpolis</td>
<td>Hierakonpolis</td>
<td>Main Deposit</td>
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<td>medium t 1</td>
<td>diagonal</td>
<td>NA</td>
<td>absent to small</td>
<td>promine nt</td>
<td>at or above dewclaws</td>
<td>NA</td>
<td>NA</td>
<td>cow</td>
<td>standing with calf</td>
<td>animal is enclosed in a human-made structure</td>
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<tr>
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<td>Naqada III</td>
<td>Hierakonpolis</td>
<td>Hierakonpolis</td>
<td>Main Deposit</td>
<td>NA</td>
<td>crescent</td>
<td>medium t 2</td>
<td>horizontal</td>
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<td>absent to small</td>
<td>promine nt</td>
<td>at or above dewclaws</td>
<td>round end</td>
<td>NA</td>
<td>NA</td>
<td>walking</td>
<td>400,000 cattle</td>
<td>163. (Quibell 1900, 9) bucrania on enclosure wall of temple</td>
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<td>Ivory Knife Handles</td>
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<td>Brooklyn Museum, Brooklyn</td>
<td>09.889.118</td>
<td>Naqada III</td>
<td></td>
<td>elephant</td>
<td>NA</td>
<td>Abu Zaidan</td>
<td>Funerary</td>
<td>Tomb 32</td>
<td>NA</td>
<td>(left to right) a-j short</td>
<td>short b-f</td>
<td>medium a-j</td>
<td>g-j</td>
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<td>Abu Zaidan</td>
<td>funerary</td>
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<td>1900, pl.</td>
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**Reference**

General Material: [General](https://example.com)

Provenance: [Provenance](https://example.com)

Shape: [Shape](https://example.com)

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Horn Shape: [Horn Shape](https://example.com)

Angle of Protrusion: [Angle of Protrusion](https://example.com)

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Dewlap Size: [Dewlap Size](https://example.com)

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Sex: [Sex](https://example.com)

Textual Evidence: [Textual Evidence](https://example.com)

Activity: [Activity](https://example.com)

Notes: [Notes](https://example.com)
## Appendix E- Representations of cattle from Giza

<table>
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<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Reference</th>
<th>Image</th>
<th>Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
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<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
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<th>Activity of cattle</th>
<th>Textual Evidence - cattle types</th>
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<td>Hemert e</td>
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<td>(Hassan 1950, G 57)</td>
<td>offering</td>
<td>4th Dynasty (OEE database)</td>
<td>right thickness of the entrance</td>
<td>1.78</td>
<td>extra-long</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>head in proportion to body</td>
<td>moderate</td>
<td>NA</td>
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<td>flat end</td>
<td>ox</td>
<td>iw3-ox</td>
<td>walking/being led-int iw3 prt-H^3^r-bringing the ox</td>
<td>as an offering (Hassan 1950, 50)</td>
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<td>Hemert e</td>
<td>Central Field</td>
<td>(Hassan 1950, G 58)</td>
<td>offering</td>
<td>4th Dynasty (OEE database)</td>
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<td>1.1 b 1.3</td>
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<td>a-b) head in proportion to body</td>
<td>a-b) present</td>
<td>a-b) concave</td>
<td>a-b) at or above dewlap</td>
<td>a-b) flat end</td>
<td>a-b) ox</td>
<td>iw3-ox</td>
<td>walking/being led-int iw3 nDt-Hr-bringing the ox as gifts (Hassan 1950, 50)</td>
<td>a-b)</td>
<td>fancy collar / large body</td>
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<td>Meresankh III</td>
<td>G 7530, G 7540</td>
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<td>main room, east wall, north of entrance</td>
<td>1.2 a 1.2</td>
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<td>a) medium b) NA (left to right, front to back) a-b) long</td>
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<td>a-b) ox</td>
<td>a) my nDt-stalled ox b) iw3 nDt-Hr cow of offering</td>
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<td>Debehen</td>
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<td>northern room of the chapel: southern wall</td>
<td>1.5 a 1.4 b 1.2</td>
<td>c) medium</td>
<td>a-c) diagnosta</td>
<td>a-c) heads in proportion to the body</td>
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<td>c) a-c) NA</td>
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<td>at or above the dewlap</td>
<td>flat end</td>
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<td>iw3</td>
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<td>G 7060</td>
<td>(Lepsius 1849, 1859, pl. 17b)</td>
<td>offering</td>
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<td>east side</td>
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<td>(Lepsius 1849- 1859, pl. 19) first register</td>
<td>4th-5th Dynasty (OEE database)</td>
<td>offering west wall</td>
<td>1.9</td>
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<td>lyre 1</td>
<td>diagonally on to body</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>at or above the dewlap</td>
<td>flat end</td>
<td>ox</td>
<td>mostly white with small spots</td>
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<td>lyre 1</td>
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<td>NA</td>
<td>concave</td>
<td>at or above the dewlap</td>
<td>NA</td>
<td>ox</td>
<td>turiing its head to back</td>
<td>lean</td>
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<td>Rawer II</td>
<td>G 5470: 32</td>
<td>(Junker 1938, 233 fig. 48) second register</td>
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<td>inspection east wall</td>
<td>NA</td>
<td>1.26</td>
<td>b-d) NA</td>
<td>e) 1.3</td>
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<td>a-e) heads in proporti on to the body</td>
<td>a-b) 200 m, iw3-100 m</td>
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<td>G 4970</td>
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<td>G 7948: G 75</td>
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<td>NA</td>
<td>a-j) average 1.05 k-m) NA</td>
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<td>long</td>
<td>a-j)</td>
<td>straight profile, heads proportion to body</td>
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<td>j) at or above dewlap k-o)</td>
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<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
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<td>Dewlap Size</td>
<td>Cervico-thoracic Chump</td>
<td>Back Shape</td>
<td>Tail Length at or above the dewlap</td>
<td>Switch Shape</td>
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<td>lyre 1</td>
<td>a</td>
<td>a-b) lyre 1</td>
<td>b) modera</td>
<td>b) concav</td>
<td>b) straight</td>
<td>at or above the dewlap</td>
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<td>ox</td>
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<td>(Badawy 1976, fig. 29)</td>
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<td>first register</td>
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Bibliography
Aris and Phillips Ltd. and Seshemnefer II (G5080). The Australian University of California Publications: Occasional.
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<th>Horn Shape</th>
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<th>Back Shape</th>
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<th>Switch Shape</th>
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<td>Senedjemib</td>
<td>G2378 : 26</td>
<td>(Brovarski 2001, fig. 119)</td>
<td>5th Dynasty (OEE database)</td>
<td>room II, south wall, east of door</td>
<td>a) 1 b) NA</td>
<td>NA</td>
<td>(left to right) a) medium b) lyre 2 horizontal</td>
<td>a) head in proportion to body</td>
<td>b) a) not present</td>
<td>a) straight b) concave</td>
<td>a) at or above the dewclaws b) at or above the dewclaws c) NA d) a) straight b) concave</td>
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<td>m</td>
<td>walking/ being led</td>
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<td>G 4920: 47</td>
<td>(Lepsius 1849-1859, fig. 31a) bottom register</td>
<td>5th Dynasty (OEE database)</td>
<td>chamber, east side</td>
<td>a-d) avg. 2.6</td>
<td>NA</td>
<td>(left to right, front to back) a-d) extra-long</td>
<td>a-d) diagonal</td>
<td>a-c) heads in proportion to body</td>
<td>a-b-c) small d) medium e) not present</td>
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<td>homelss round head</td>
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<td>head in proportion to body</td>
<td>modera te not present</td>
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<td>int iw3 pry H^3rw - bringing ox and gifts (Weeks 1994, 33); walking/ being led</td>
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<td>a-c) lyre 1</td>
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<td>a-b-c) at or above the dewclaws d) NA b-c) flat end a-b) m n iw3- young ox c) m ng- young ??</td>
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<td>a-b) walking/ being led c) elsewhere d) collar</td>
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<td>Itisen</td>
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<td>(Hassan 1944, fig. 123) second register</td>
<td>5th Dynasty (OE database)</td>
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<td>eastern wall of chapel</td>
<td>1.6</td>
<td>long</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>flat end bull</td>
<td>NA</td>
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<td>long-horned bull</td>
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<td>Redi</td>
<td>G 2086</td>
<td>(Roth 1995, fig. 143) third register</td>
<td>5th Dynasty (Roth 1995, 35)</td>
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<td>lyre 1</td>
<td>head in proportion to the body</td>
<td>moderate</td>
<td>present</td>
<td>straight</td>
<td>at or above dewclaws</td>
<td>round end</td>
<td>NA</td>
<td>r-miw3-young ox</td>
<td>walking/being led</td>
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<td>Redi</td>
<td>G 2086</td>
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<td>inspection</td>
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<td>lyre 1</td>
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<td>present</td>
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<td>below dewclaws</td>
<td>flat end ox</td>
<td>r-miw3-young ox</td>
<td>walking/being led</td>
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<td>not present</td>
<td>concave</td>
<td>below dewclaws</td>
<td>flat end ox</td>
<td>r-miw3-young ox</td>
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<td>NA</td>
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<td>Image Reference</td>
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<td>Location in Tomb</td>
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<td>Horn size</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic hump</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Textual Evidence-cattle types</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<td>Senedj</td>
<td>G 2370. LG 27</td>
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<td>room II, west wall</td>
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<td>NA</td>
<td>at or above dewclaw</td>
<td>round end</td>
<td>bull</td>
<td>NA</td>
<td>mhp-copulater</td>
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<td>lyre 1</td>
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<td>NA</td>
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<td>offering</td>
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<td>lyre 1</td>
<td>horizontal</td>
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<td>modera te</td>
<td>not present</td>
<td>NA</td>
<td>NA</td>
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<td>wall</td>
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<td>small head</td>
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<td>NA</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>m沃尔-living</td>
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<td>5th Dynasty (OEE database)</td>
<td>offering</td>
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<td>1.3</td>
<td>(left to right) a) long b) short</td>
<td>a) lyre 1</td>
<td>deformed</td>
<td>a-b)</td>
<td>diagonal a)</td>
<td>a-b)</td>
<td>b)</td>
<td>a-b)</td>
<td>concave</td>
<td>a-b)</td>
<td>at or above dewclaw</td>
<td>a-b)</td>
<td>flat end</td>
<td>a-b)</td>
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<td>Central Field</td>
<td>(Hassan 1950, 175 fig. 167)</td>
<td>5th Dynasty (OEE database)</td>
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<td>2</td>
<td>extra-long</td>
<td>diaphragma</td>
<td>horizontal</td>
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<td>concave</td>
<td>NA</td>
<td>NA</td>
<td>ox</td>
<td>NA</td>
<td>NA</td>
<td>ox</td>
<td>walking/being led</td>
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<td>(Weeks 1994, fig. 18) second register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>Third chamber, east wall</td>
<td>1.6</td>
<td>a-c)</td>
<td>long</td>
<td>a-c)</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>a)</td>
<td>NA</td>
<td>b)</td>
<td>NA</td>
<td>a-b)</td>
<td>modera te</td>
<td>b)</td>
<td>NA</td>
<td>c)</td>
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<td>G 6010. LG 15</td>
<td>(Weeks 1994, fig. 24) second register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>Third chamber, north wall</td>
<td>1.5</td>
<td>long</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>head in proportion to body</td>
<td>absent to small</td>
<td>not present</td>
<td>a-c)</td>
<td>at or above dewclaw</td>
<td>flat end</td>
<td>ox</td>
<td>m沃尔-youth ox</td>
<td>walking/being led</td>
<td>H^3 -1.000</td>
<td>NA</td>
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<td>(Weeks 1994, fig. 24) first register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>Third chamber, north wall</td>
<td>1.3</td>
<td>long</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>head in proportion to body</td>
<td>absent to small</td>
<td>not present</td>
<td>a-c)</td>
<td>at or above dewclaw</td>
<td>flat end</td>
<td>ox</td>
<td>m沃尔-youth ox</td>
<td>walking/being led</td>
<td>H^3 -1.000</td>
<td>NA</td>
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<td>Tomb Owner</td>
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<td>Image Reference</td>
<td>Date</td>
<td>Type of Scene (offering, inspection, receiving of tribute, exception)</td>
<td>Location in Tomb</td>
<td>X</td>
<td>Horn size</td>
<td>Horn Shape</td>
<td>Horn Protrusion (long, broad)</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic hump</td>
<td>Tail Length</td>
<td>Back Shape</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Textual Evidences of cattle types</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<td>Sekhemka</td>
<td>G 1029</td>
<td>(Simpson 1980, fig. 4) first register</td>
<td>5th Dynasty (1980, 1)</td>
<td>chapel, east wall</td>
<td>a) .98, b) 1.1, c) 1.5</td>
<td>(left to right, front to back) a) a-c, b) c, c) medium, d) long, e) lyre 1</td>
<td>a-d) diaphragm on body a-b) absent in proportion to the body a-c) absent in proportion to the body a) present, d) absent in proportion to the body c) present d) present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) concave b) NA c) c-d) concave</td>
<td>a) straight b) NA c) straight</td>
<td>a-b) NA c) at or above dewclaws c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-c) ox b) NA c) c-d) NA m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
<td>a-e) m (3-6) young ox</td>
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<td>Nefer-khuwi</td>
<td>G 2098</td>
<td>(Roth 1995, fig. 194)</td>
<td>5th Dynasty (1995, 145)</td>
<td>chapel, south wall</td>
<td>a) 1.5, b) 1.4, c) NA</td>
<td>(left to right, front to back) a) a-c, b) c, c) lyre 1</td>
<td>a-b) diaphragm on body a) present, d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) not present d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<td>a-b) NA c) flat end</td>
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<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<tr>
<td>Kapi</td>
<td>G 2091</td>
<td>(Roth 1995, fig. 155)</td>
<td>5th Dynasty (1995, 100)</td>
<td>west wall of corridor, south end</td>
<td>a) 1.06, b) NA</td>
<td>(left to right, fourth and fourth bovines) a) b) deform</td>
<td>a-b) diaphragm on body a) present, d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) not present d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<tr>
<td>Kapi</td>
<td>G 2091</td>
<td>(Roth 1995, fig. 167) second register</td>
<td>5th Dynasty (1995, 100)</td>
<td>west wall of corridor, north end</td>
<td>a) 1.3, b) 1.4, c) NA</td>
<td>(left to right, a-b) long c) medium, d) e) long, e) lyre 1</td>
<td>a-b) diaphragm on body a) present, d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) not present d) not present</td>
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<td>a-b) NA c) flat end</td>
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<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<td>(Roth 1995, fig. 168) second register</td>
<td>5th Dynasty (1995, 100)</td>
<td>north pillar of chapel</td>
<td>a) 1.5, b) 1.4</td>
<td>(left to right, a-b) long</td>
<td>a-b) diaphragm on body a) present, d) not present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<tr>
<td>Kaemn efert II</td>
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<td>(Hassan 1936, fig. 136) eastern wall</td>
<td>5th or 6th Dynasty (1936, 136 e)</td>
<td>eastern wall</td>
<td>a) 1.5, b) 1.74</td>
<td>(left to right, third oxen) a) long, b) long, c) long, d) long, e) long, e) lyre 1</td>
<td>a-b) diaphragm on body a-b) absent in proportion to the body a) present, d) present</td>
<td>a) at or above the dewclaws b) NA c-d) at or above the dewclaws c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA c) flat end</td>
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<td></td>
<td>(Hassan 1936, fig. 138) western wall</td>
<td>5th or 6th Dynasty (1936, 138)</td>
<td>western wall</td>
<td>1.5</td>
<td>long</td>
<td>lyre 1 NA NA not present NA NA NA NA NA NA NA not present</td>
<td>a-b) NA c) flat end</td>
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<td>a-b) NA c) flat end</td>
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<th>Date</th>
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<th>Location in Tomb</th>
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<th>Horn Size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico Thoracic Hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence of cattle types</th>
<th>Activity of cattle</th>
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<td>1.2</td>
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<td>lyre 1</td>
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<td>head</td>
<td>modera te</td>
<td>not present</td>
<td>below</td>
<td>dewclaw s</td>
<td>round</td>
<td>end ox</td>
<td>NA</td>
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<td>being led</td>
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<td>(Hassan 1944, fig. 69) second register</td>
<td>5th-6th Dynasty (OEE Database)</td>
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<td>northern wall of southern chapel</td>
<td>1.5</td>
<td>long</td>
<td>lyre 1</td>
<td>diacona small</td>
<td>head</td>
<td>absent to small</td>
<td>present</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>walking/</td>
<td>being led</td>
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<td>NA</td>
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<td>northern wall of southern chapel</td>
<td>a)</td>
<td>1.4</td>
<td>b)</td>
<td>1.4</td>
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<td>a)</td>
<td>horizontal</td>
<td>b)</td>
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<td>head</td>
<td>a-b) at or above</td>
<td>the dewclaws</td>
<td>c)</td>
<td>NA</td>
<td>d)</td>
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<td>(Badaway 1976, fig. 20)</td>
<td>5th-6th Dynasty (OEE Database)</td>
<td>inspection</td>
<td>west wall</td>
<td>2.1</td>
<td>a)</td>
<td>1.7</td>
<td>b)</td>
<td>1.7</td>
<td>(left to right) a-b</td>
<td>back to front</td>
<td>a-c)</td>
<td>extra long</td>
<td>a-d)</td>
<td>diacona small</td>
<td>head</td>
<td>absent</td>
<td>to small</td>
<td>present</td>
<td>a-b) at or above</td>
</tr>
<tr>
<td>Akhmer uletesut</td>
<td>(Smith 1949, fig. 226c)</td>
<td>5th-6th Dynasty (OEE Database)</td>
<td>exception</td>
<td>NA</td>
<td>1.4</td>
<td>long</td>
<td>crescent</td>
<td>t 1</td>
<td>diacona</td>
<td>on to body</td>
<td>absent</td>
<td>to small</td>
<td>not present</td>
<td>NA</td>
<td>round</td>
<td>cow</td>
<td>NA</td>
<td>giving birth</td>
<td>NA</td>
<td>spots</td>
</tr>
<tr>
<td>Seshe mnefer IV</td>
<td>(Lepsius 1849-1859, pl. 80e)</td>
<td>5th-6th Dynasty (OEE Database)</td>
<td>offering</td>
<td>Door between room A-B, eastern face</td>
<td>NA</td>
<td>NA</td>
<td>homles s round</td>
<td>head</td>
<td>NA</td>
<td>head in proporti on to body</td>
<td>absent</td>
<td>to small</td>
<td>not present</td>
<td>straight</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>round</td>
<td>end ox</td>
<td>NA</td>
<td>walking/</td>
</tr>
<tr>
<td>Seshe mnefer IV</td>
<td>(Junker 1953, 209 abbrev. 80)</td>
<td>5th-6th Dynasty (OEE Database)</td>
<td>offering</td>
<td>room B, west wall</td>
<td>1.6</td>
<td>long</td>
<td>lyre 1</td>
<td>diacona small</td>
<td>head</td>
<td>moderate</td>
<td>present</td>
<td>straight</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>round</td>
<td>end ox</td>
<td>i3-w H</td>
<td>4rny</td>
<td>mdw</td>
<td>walking/</td>
</tr>
<tr>
<td>Niuty</td>
<td>G 4611: 2 (Hassan 1936, fig. 147)</td>
<td>5th-6th Dynasty (OEE Database)</td>
<td>inspection</td>
<td>Southern part of the west side</td>
<td>a-c)</td>
<td>1.9</td>
<td>NA</td>
<td>d)</td>
<td>(left to right, back to front) a-c)</td>
<td>horizont al</td>
<td>d)</td>
<td>extra long</td>
<td>a-c)</td>
<td>diacona</td>
<td>small</td>
<td>head</td>
<td>a-c)</td>
<td>modera te</td>
<td>d)</td>
<td>a-b)</td>
</tr>
<tr>
<td>Tomb Owner</td>
<td>Tomb Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Type of Scene (offering, inspection, receiving of tribute, exception)</td>
<td>Location in Tomb</td>
<td>X</td>
<td>Horn size</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervical Thoracic hump</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Textual Evidence of cattle types</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
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<td>-------------------------------------------------</td>
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<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Niuty</td>
<td>G 4611-50</td>
<td>(Lepsius 1913, pl. 30) first register</td>
<td>Southern part of the west side</td>
<td>(left to right) a) long b) extra-long</td>
<td>a-b) horizontal</td>
<td>b-b) absent to small</td>
<td>a-b) not present</td>
<td>a-b) straight</td>
<td>a-b) round end</td>
<td>a-b) ox</td>
<td>m</td>
<td>NA</td>
<td>(imy-r-mDf)-first shepherd</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tjetu</td>
<td>G 2001</td>
<td>(Simpson 1980, fig 22) top</td>
<td>scenes above false doors and panels</td>
<td>NA</td>
<td>long</td>
<td>lyre 1</td>
<td>NA</td>
<td>absent to small</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>iw3-ox</td>
<td>walking/being led</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Tjetu</td>
<td>G 2001</td>
<td>(Simpson 1980, fig 22) bottom</td>
<td>scenes above false doors and panels</td>
<td>NA</td>
<td>long</td>
<td>lyre 1</td>
<td>NA</td>
<td>absent to small</td>
<td>NA</td>
<td>straight</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>bull</td>
<td>ka-'bull'</td>
<td>long-horned bull</td>
<td>spots</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iasen</td>
<td>G 2196</td>
<td>(Simpson 1980, fig 30) second register</td>
<td>exception</td>
<td>(first bovine on the left)</td>
<td>long</td>
<td>lyre 2</td>
<td>modera te</td>
<td>present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>NA</td>
<td>long-horned bull</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Iasen</td>
<td>G 2196</td>
<td>(Simpson 1980, fig 31) second register</td>
<td>offering</td>
<td>(left to right) a) homelies b-c) homelies s-e) long</td>
<td>a) NA</td>
<td>b-c) at or above dewclaws</td>
<td>b-c) at or above dewclaws</td>
<td>a-b) concave</td>
<td>d) straight</td>
<td>b-e) flat end</td>
<td>a-e) ox</td>
<td>NA</td>
<td>walking/being led</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Iasen</td>
<td>G 2196</td>
<td>(Simpson 1980, fig 31) first register</td>
<td>offering</td>
<td>(left to right) a) horizont al b) diaphon a-l</td>
<td>a-d) head in proport on to body</td>
<td>a-b) not present</td>
<td>b-d) present</td>
<td>concave</td>
<td>d) at or above dewclaws</td>
<td>flat end</td>
<td>ox</td>
<td>young cow</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qar</td>
<td>G 7101</td>
<td>(Simpson 1976, fig. 19a) presentation</td>
<td>lower stairway, south wall</td>
<td>NA</td>
<td>long</td>
<td>lyre 1</td>
<td>modera te</td>
<td>NA</td>
<td>flat end</td>
<td>ox</td>
<td>NA</td>
<td>eating/dinking from bowl</td>
<td>NA</td>
<td></td>
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129
<table>
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<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervicothoracic Shape</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence of cattle</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niankhkhnum</td>
<td>Central Field</td>
<td>(Hassan 1950,139 fig. 131) offering</td>
<td>6th Dynasty (OEE database)</td>
<td>offering</td>
<td>wall between northern and southern false-doors</td>
<td>1.5</td>
<td>long</td>
<td>lyre 1</td>
<td>horizontal</td>
<td>small head</td>
<td>modera te not present</td>
<td>concave</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>flat end ox</td>
<td>iW3-ox</td>
<td>walking/ being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khnument</td>
<td>G 2374</td>
<td>(Brovarski 2001, fig. 88) bottom register</td>
<td>6th Dynasty (OEE database)</td>
<td>presentation</td>
<td>room II, south wall</td>
<td>a) 1.2</td>
<td>b) NA</td>
<td>c) 1.2</td>
<td>a) (left to right) a) medium b) hornless c) hornless d) lyre 1</td>
<td>a) diogona l b) NA c) diogona l diogona l d) lyre 1</td>
<td>a-c) heads in propor to the body</td>
<td>absent to small</td>
<td>a-c) present</td>
<td>a-b) NA c) at or above</td>
<td>dewclaws</td>
<td>a-b) NA c) flat end a-c) ox</td>
<td>a-c) m iW3-&quot;yo&quot; ox</td>
<td>walking/ being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Akhet-hetep</td>
<td>G 8942</td>
<td>(Hassan 1932, 79 fig.137) offering</td>
<td>5th or 6th Dynasty (The Giza Archives)</td>
<td>offering</td>
<td>northern face of part A of chapel</td>
<td>NA</td>
<td>hornless</td>
<td>horns flat head</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Herunef er</td>
<td>G 2353</td>
<td>(Simpson &amp; 1980, fig 49) second register</td>
<td>5th Dynasty (The Giza Archives)</td>
<td>offering</td>
<td>west entrance jamb</td>
<td>1.4</td>
<td>long</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>small head</td>
<td>moderate present</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>r(n) iW3- young ox</td>
<td>tethere d and being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemu and Sheps eskaefan kh</td>
<td>G 8492</td>
<td>(Hassan 1950, 84 fig. 66) offering</td>
<td>5th or 6th Dynasty (The Giza Archives)</td>
<td>offering</td>
<td>right thickness of the entrance</td>
<td>1.1</td>
<td>medium</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>small head</td>
<td>absent to small present</td>
<td>concave</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>flat end ox</td>
<td>m iW3- young ox</td>
<td>walking/ being led+nDt rope collar</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemu and Sheps eskaefan kh</td>
<td>G 8493</td>
<td>(Hassan 1950, 85 fig. 67) offering</td>
<td>5th or 6th Dynasty (The Giza Archives)</td>
<td>offering</td>
<td>left thickness of entrance</td>
<td>1.2</td>
<td>medium</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>small head</td>
<td>moderate present</td>
<td>concave</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>flat end ox</td>
<td>m iW3- young ox</td>
<td>walking/ being led+nDt rope collar</td>
<td>NA</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hemu and Sheps eskaefan kh</td>
<td>G 8494</td>
<td>(Hassan 1950, 89 fig. 70) offering</td>
<td>5th or 6th Dynasty (The Giza Archives)</td>
<td>offering</td>
<td>false door in chapel</td>
<td>1.4</td>
<td>long</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>small head</td>
<td>moderate present</td>
<td>concave</td>
<td>at or above</td>
<td>the dewclaws</td>
<td>flat end ox</td>
<td>m iW3- young ox</td>
<td>walking/ being led rope collar</td>
<td>NA</td>
<td></td>
<td></td>
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</tbody>
</table>
## Appendix F- Representations of cattle from Abusir

| Tomb Owner | Tomb Number | Image Reference | Date | Type of Scene (offering, inspection, receiving of tribute) | Locatio n in Tomb | X | Horn size | Horn Shape | Horn Protrusion Angle | General Skull Morphol-Develop Size | Cervico-thoracic hump | Back Shape | Tail Length | Switch Shape | Sex | Textual Evidence - cattle types | Activity of cattle | Notes | Color |
|------------|-------------|-----------------|------|-------------------------------------------------------------|-------------------|---|-----------|------------|----------------------|-------------------------------|----------------|-------------|-------------|----------|----------------|----------------|-------|-------|
| Qar        |             |                 |      | late 5th-early 6th Dynasty (Bárta et al. 2009, 91 fig. 5.3.2) offering | Entranc e of chapel 2, east wall | a-b) 1 | medium flat | a-b) lyre 1 | a-b) head proportional to body b) small head | a-b) absent | a-b) present | a) head proportional to body b) small head | a-b) | a-b) straight | a) NA | b) or above hocks | a) NA | b) ox | a-b) walking/being led | both animals have a neck collar on | a) white with many small black spots b) white with large black spots |
| Qar        |             |                 |      | late 5th-early 6th Dynasty (Bárta et al. 2009, 91 fig. 5.3.3) third register | Entrance of chapel 2, west wall | b) NA | NA | medium flat | a-b) lyre 1 | a-b) head proportional to body | a-b) present | a-b) | a-b) straight | a) at or above dewclaws b) NA | a) flat end | b) NA | a) ox b) m 'iw3-young ox' | a-b) walking/being led | both animals have a neck collar on | NA |
| Qar        |             |                 |      | late 5th-early 6th Dynasty (Bárta et al. 2009, 91 fig. 5.3.3) first register | Entrance of chapel 2, west wall | b) 95 | medium flat | a-b) lyre 1 | a-b) head proportional to body | a-b) present | a-b) | a-b) straight | a) at or above dewclaws b) NA | a-b) m 'iw3-young ox' | a-b) NA | a) ox b) NA | a-b) walking/being led | both animals have a neck collar on | NA |

| Temple of Sahure (Borchardt 1913b, pl. 1) | 5th Dynasty | exception | 1913b | (back to front) a-b) | | a-b) 2.9 | extra-long | a-b) lyre 1 | a-b) diaphragma | a-b) absent | a-b) not present | a) at or above dewclaws b) NA | a) flat end | b) NA | a) ox | NA | make-up is being applied | Putting make-up on the sacrificial bovines | NA |

| Temple of Sahure (Borchardt 1913b, pl. 47) | 5th Dynasty | exception | NA | a-b) 2.9 | | a-b) 2.9 | extra-long | a-b) lyre 1 | a-b) diaphragma | a-b) absent | a-b) not present | a) at or above dewclaws b) NA | a) flat end | b) NA | a) ox | NA | make-up is being applied | Putting make-up on the sacrificial bovines | NA |
### Appendix G- Representations of cattle from Saqqara

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn Protrusion</th>
<th>Horn Shape</th>
<th>Horn Angle</th>
<th>General Skull Morphology</th>
<th>General Skull Morphology</th>
<th>Cervico-thoracic Hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence for cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
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<tbody>
<tr>
<td>Seshebaster</td>
<td>(Barsanti 1900, fig. 9)</td>
<td>inspection</td>
<td>5th-6th Dynasty (Barsanti 1900, 150)</td>
<td>east wall</td>
<td>(Left to right, front to back)</td>
<td>a) 1.5 b-d) NA</td>
<td>s</td>
<td>a) lyre 1 b-d) horns round l b-d) diagonal to body d) head small</td>
<td>a-b) not present to c) present</td>
<td>d) NA</td>
<td>a-c) at or above dewclaws d) NA</td>
<td>a-c) flat end</td>
<td>NA</td>
<td>a-b) being milked b) kneeling down c-d) being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Manefer</td>
<td>LS 17. H. 2</td>
<td>(Lepsius 1849-1859, pl. 69) third register</td>
<td>5th Dynasty (OEE database)</td>
<td>south side, western half of chamber</td>
<td>a) 1.5 b) 1.84</td>
<td></td>
<td>a-b) lyre 1</td>
<td>b) head proportionate to body</td>
<td>a-b) not present</td>
<td>a) NA b) concave c) at or above dewclaws</td>
<td>a) NA b) ox</td>
<td>NA</td>
<td>a-b) m. lw3 yi ung ox</td>
<td>a-b) walking bein g led</td>
<td>a-b) walking bein g led</td>
<td>a-b) wearing fancy neck scarves</td>
<td>NA</td>
<td></td>
<td></td>
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<tr>
<td>Manefer</td>
<td>LS 17. H. 3</td>
<td>(Lepsius 1849-1859, pl. 69) second register</td>
<td>5th Dynasty (OEE database)</td>
<td>south side, western half of chamber</td>
<td>a) 1.27 b) 1.28</td>
<td></td>
<td>a-b) lyre 1</td>
<td>a-b) head proportionate to body</td>
<td>a-b) not present</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>b) ox</td>
<td>a-b) m. lw 3 yi ung ox</td>
<td>a-b) walking bein g led</td>
<td>a-b) wearing fancy neck scarves</td>
<td>a-b) walking bein g led</td>
<td>NA</td>
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<td></td>
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<tr>
<td>Manefer</td>
<td>LS 17. H. 4</td>
<td>(Lepsius 1849-1859, pl. 69) third register</td>
<td>5th Dynasty (OEE database)</td>
<td>south side, eastern half of chamber</td>
<td>a) 1.27 b) 1.29 c) 1.7</td>
<td></td>
<td>a-b) lyre 1</td>
<td>a-b) head proportionate to body</td>
<td>a-b) not present</td>
<td>a-c) straight</td>
<td>a-c) at or above dewclaws</td>
<td>c) ox</td>
<td>a-b) m. lw 3 yi ung ox</td>
<td>a-b) walking bein g led</td>
<td>a-b) walking bein g led</td>
<td>a-b) wearing fancy neck scarves</td>
<td>NA</td>
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<td>LS 17. H. 5</td>
<td>(Lepsius 1849-1859, pl. 69) second register</td>
<td>5th Dynasty (OEE database)</td>
<td>south side, eastern half of chamber</td>
<td>a-b) 1.13</td>
<td></td>
<td>a-b) lyre 1</td>
<td>a-b) head proportionate to body</td>
<td>a-b) not present</td>
<td>a-b) ox</td>
<td>a-b) m. lw 3 yi ung ox</td>
<td>a-b) walking bein g led</td>
<td>a-b) walking bein g led</td>
<td>a-b) wearing fancy neck scarves</td>
<td>a-b) walking bein g led</td>
<td>NA</td>
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<tr>
<td>Ptahhotep</td>
<td>31</td>
<td>(Lepsius 1849-1859, pl. 102a) second register</td>
<td>5th-6th Dynasty (OEE database)</td>
<td>offering</td>
<td>west wall of the hall A</td>
<td>a-b) NA</td>
<td></td>
<td>a-b) horns flat head</td>
<td>a-b) head proportionate to body</td>
<td>a-b) present</td>
<td>a-b) at or above dewclaws</td>
<td>a-b) ox</td>
<td>a-b) H.3y3 Dba- homies s</td>
<td>a-c) mwet</td>
<td>a-b) H.3y3 Dba</td>
<td>a-c) walking bein g led</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ptahhotep</td>
<td>31</td>
<td>(Lepsius 1849-1859, pl. 102a) first register</td>
<td>5th-6th Dynasty (OEE database)</td>
<td>offering</td>
<td>west wall of the hall A</td>
<td>a-c) 1.6</td>
<td></td>
<td>a-c) lyre 1</td>
<td>a-c) head proportionate to body</td>
<td>a-c) present</td>
<td>a-b) NA c) at or above dewclaws</td>
<td>a-b) ox</td>
<td>a-b) H.3y3 Dba</td>
<td>a-c) bh3-s-m others of calves</td>
<td>a-b) H.3y3 Dba</td>
<td>a-c) walking bein g led</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ptahhotep</td>
<td>31</td>
<td>(Lepsius 1849-1859, pl. 102b) second register</td>
<td>5th-6th Dynasty (OEE database)</td>
<td>offering</td>
<td>west wall of the hall A</td>
<td>NA</td>
<td></td>
<td>horns flat head</td>
<td>horns flat head</td>
<td>head proportionate to body</td>
<td>a-b) present at or above dewclaws</td>
<td>round ox</td>
<td>H.3y3 Dba</td>
<td>a)</td>
<td>walking bein g led</td>
<td>H.3y3 Dba</td>
<td>NA</td>
<td></td>
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<tr>
<td>Owner</td>
<td>Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Type of Scene</td>
<td>Location in Tomb</td>
<td>X</td>
<td>Horn size</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-Thoracic Hump</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<tr>
<td>Ptahhotep</td>
<td>31</td>
<td>(Lepsius 1849- 1859, pl. 104a)</td>
<td>5th-6th Dynasty (OEE database)</td>
<td>offering</td>
<td>southside of room B</td>
<td>1.2</td>
<td>a-b</td>
<td>1.5</td>
<td>(left to right, back to front)</td>
<td>a-d</td>
<td>a-c</td>
<td>a-d</td>
<td>a-c</td>
<td>d) round end</td>
<td>a) at or above dewclaws (b-c)</td>
<td>NA</td>
<td>m Hry b- ox d) ox</td>
<td>b-c</td>
<td>ox b- ox d) ox</td>
<td>walking/beinig led</td>
</tr>
<tr>
<td>Rashepes</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1849-1859, pl. 61b)</td>
<td>5th Dynasty (OEE database)</td>
<td>offering</td>
<td>inside of chamber B</td>
<td>1.27</td>
<td>a-b</td>
<td>1.6</td>
<td>(top to bottom, left to right)</td>
<td>a-c</td>
<td>horsem s not flat</td>
<td>a-c</td>
<td>NA</td>
<td>NA</td>
<td>a-b</td>
<td>a-c</td>
<td>a-d</td>
<td>a-b</td>
<td>a-c</td>
<td>a-d</td>
</tr>
<tr>
<td>Rashepes</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1849-1859, pl. 62)</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>room C, south wall</td>
<td>1.2</td>
<td>a-b</td>
<td>2</td>
<td>(left to right, front to back)</td>
<td>a-b</td>
<td>d)</td>
<td>a-c</td>
<td>NA</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
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<td>Rashepes</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1849-1859, pl. 62)</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>room C, south wall</td>
<td>1.2</td>
<td>a-b</td>
<td>2</td>
<td>(left to right, front to back)</td>
<td>a-b</td>
<td>d)</td>
<td>a-c</td>
<td>NA</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
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<tr>
<td>Rashepes</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1849-1859, pl. 62)</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>room C, south wall</td>
<td>1.2</td>
<td>a-b</td>
<td>2</td>
<td>(left to right, front to back)</td>
<td>a-b</td>
<td>d)</td>
<td>a-c</td>
<td>NA</td>
<td>a-c</td>
<td>a-c</td>
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<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
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<tr>
<td>Rashepes</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1849-1859, pl. 62)</td>
<td>5th Dynasty (OEE database)</td>
<td>offering</td>
<td>entrance to chamber B</td>
<td>1.2</td>
<td>a-b</td>
<td>2</td>
<td>(left to right, back to front)</td>
<td>a-b</td>
<td>d)</td>
<td>a-c</td>
<td>NA</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
<td>a-c</td>
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<tr>
<td>Tomb Owner</td>
<td>Tomb Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Type of Scene (offering, inspection, receiving of tribute, exception)</td>
<td>Location in Tomb</td>
<td>X</td>
<td>Horn Size</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic Hump</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Textual Evidence of cattle types</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<tr>
<td>Rashepeses</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1913, pl. 41) second register</td>
<td>5th Dynasty (OEE database)</td>
<td>entrance to chamber B</td>
<td>NA</td>
<td>a-c) NA</td>
<td>a-c) hornless</td>
<td>a-c) NA</td>
<td>a-c) small heads</td>
<td>a-b) NA</td>
<td>NA</td>
<td>a-c) straight</td>
<td>a-b) NA</td>
<td>a-c) above dewlap</td>
<td>round end</td>
<td>a-b) ox</td>
<td>c) m</td>
<td>walking/bein g led -int m iw3 m iw3 n jH^3t</td>
<td>the animal is being restrained by two men sH^3tep m iw3 n jH^3t H^33w</td>
<td>-'bringing the young oxen for the evening meal'</td>
</tr>
<tr>
<td>Rashepeses</td>
<td>LD 16: S 902</td>
<td>(Lepsius 1913, pl. 41) first register</td>
<td>5th Dynasty (OEE database)</td>
<td>entrance to chamber B</td>
<td>NA</td>
<td>hornless</td>
<td>a-b) hornless</td>
<td>a-b) flat head</td>
<td>a-b) head proportionate to body</td>
<td>a-b) concave</td>
<td>a-b) at or above dewlap</td>
<td>round end</td>
<td>a-b) ox</td>
<td>a-b) NA</td>
<td>walking/bein g led</td>
<td>neck collars</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niankhknum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, abb.17)</td>
<td>inspection</td>
<td>northside of vestibule</td>
<td>NA</td>
<td>(Left to right, excluding calf in the middle)</td>
<td>a-b) hornless</td>
<td>a-b) flat</td>
<td>a-b)</td>
<td>a-b) modera te</td>
<td>a-b) at or above dewlap</td>
<td>a-b) at or above the hocks</td>
<td>a-b) ox</td>
<td>a-b) NA</td>
<td>walking/bein g led - sH^3tep m iw3 n jH^3t</td>
<td>horlmes s adult wearing head mat</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Niankhknum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, pl. 52)</td>
<td>offering</td>
<td>Entrance to the rock chamber, eastern door</td>
<td>a) NA</td>
<td>(Left to right) a) hornless</td>
<td>a) hornless</td>
<td>a) hornless</td>
<td>a) head proportionate to body</td>
<td>a) absent to small</td>
<td>a) concave</td>
<td>a) at or above the hocks</td>
<td>a) NA</td>
<td>a) flat end</td>
<td>a) ox</td>
<td>walking/bein g led - sH^3tep m iw3 n jH^3t H^33w</td>
<td>bringing the young oxen for the evening meal'</td>
<td>-'walking together'</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niankhknum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, pl. 53)</td>
<td>offering</td>
<td>Entrance to the rock chamber, western door</td>
<td>a) 1</td>
<td>(Left to right) a) lyre</td>
<td>a) lyre</td>
<td>a) diagona a to body</td>
<td>a) head proportionate to body</td>
<td>a) modera te</td>
<td>a-b) at or above the hocks</td>
<td>a-b) ox</td>
<td>a-b) na</td>
<td>a-b) flat end</td>
<td>a-b) ox</td>
<td>a-b) ox</td>
<td>m iW3-‘yy’</td>
<td>m iW3-‘yy’</td>
<td>m iW3-‘yy’</td>
<td>walking/bein g led - sH^3tep m iw3 n jH^3t H^33w</td>
<td>'walking together'</td>
</tr>
<tr>
<td>Tomb Owner</td>
<td>Tomb Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Type of Scene (offering, inspection, receiving of tribute, exception)</td>
<td>Location in Tomb</td>
<td>Horns</td>
<td>Horn Angle</td>
<td>General Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic hump</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<tr>
<td>Niankhkhnum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, pl. 82)</td>
<td>offering</td>
<td>5th Dynasty (OEE database)</td>
<td>southern passageway to the Sacrificial Hall, southern doorway</td>
<td>a-c) NA</td>
<td>1.4</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) at or above the dewclaws</td>
<td>m</td>
<td>m</td>
<td>iw3-'young ox'</td>
<td>walking</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
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<td>Niankhkhnum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, pl. 83)</td>
<td>offering</td>
<td>5th Dynasty (OEE database)</td>
<td>northern doorway to the Sacrificial Hall, southern doorway</td>
<td>a-c) NA</td>
<td>1.5</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) NA</td>
<td>m</td>
<td>m</td>
<td>iw3-'young ox'</td>
<td>walking</td>
<td>being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<td></td>
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<tr>
<td>Niankhkhnum and Khnumhotep</td>
<td>(Moussa and Altenmüller 1977, pl. 84)</td>
<td>offering</td>
<td>5th Dynasty (OEE database)</td>
<td>northern doorway to the Sacrificial Hall, southern doorway</td>
<td>a-c) NA</td>
<td>0.9</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) NA</td>
<td>m</td>
<td>m</td>
<td>iw3-'young ox'</td>
<td>walking</td>
<td>being led</td>
<td>NA</td>
<td>red/brown</td>
<td></td>
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<td>Akhethetep</td>
<td>(Ziegler 2007, fig. 39)</td>
<td>third register</td>
<td>5th Dynasty (Ziegler 2007, 13)</td>
<td>offering</td>
<td>a) NA</td>
<td>1.3</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) NA</td>
<td>m</td>
<td>m</td>
<td>iw3-'young ox'</td>
<td>walking</td>
<td>being led</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<tr>
<td>Heteph erakhti</td>
<td>D 60</td>
<td>5th Dynasty (Mohr 1943, fig. 32)</td>
<td>offering</td>
<td>north wall of offering chamber</td>
<td>1.4</td>
<td>long (bull only)</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) NA</td>
<td>m</td>
<td>m</td>
<td>iw3-'pro blem'</td>
<td>not crescent shaped bull</td>
<td>NA</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Heteph erakhti</td>
<td>D 60</td>
<td>5th Dynasty (Mohr 1943, fig. 35)</td>
<td>offering</td>
<td>north wall of offering chamber</td>
<td>1.1</td>
<td>medium</td>
<td>a-c) head proportionate to body</td>
<td>a-c) head proportionate to body</td>
<td>a-c) NA</td>
<td>a-b) NA</td>
<td>m</td>
<td>m</td>
<td>iw3-'young ox'</td>
<td>walking</td>
<td>being led</td>
<td>collar</td>
<td>NA</td>
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<td>Tomb Owner</td>
<td>Tomb Number</td>
<td>Image Reference</td>
<td>Date</td>
<td>Location in Tomb</td>
<td>Type of Scene (offering, inspection, receiving of tribute, exception)</td>
<td>Location</td>
<td>X</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Textual Evidence of cattle types</td>
<td>Activity of cattle</td>
<td>Notes</td>
<td>Color</td>
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<tr>
<td>Irenkapt Unis Cemetery (Moussa and Junge 1975, pl. 13)</td>
<td>D 55</td>
<td>(Van de Walle 1978, pl. 10) offering</td>
<td>4th-5th Dynasty (OEE database)</td>
<td>south wall NA</td>
<td>exception: homed bovine wearing blanket, possibly being fed from bowl</td>
<td>no</td>
<td>NA</td>
<td>NOT HORNLESS</td>
<td>NA</td>
<td>diagonale</td>
<td>NA</td>
<td>NA</td>
<td>not present</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>walking/being⇌neck collar</td>
<td>NA</td>
<td></td>
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<tr>
<td>Neferirt enef</td>
<td>D 913</td>
<td>(Williams 1932, pl. 6) bottom register</td>
<td>5th Dynasty (OEE database)</td>
<td>offering</td>
<td>outer chamber, west wall 1.2 medium</td>
<td>lyre 1</td>
<td>head proportionate to body</td>
<td>moderate</td>
<td>present</td>
<td>concave</td>
<td>at or above dewclaw</td>
<td>round end</td>
<td>ox</td>
<td>m 1w3-3yo ung ox</td>
<td>walking/being⇌poor picture</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Neferirt enef</td>
<td>S 913</td>
<td>(Williams 1932, pl. 6) third register</td>
<td>5th Dynasty (OEE database)</td>
<td>offering</td>
<td>outer chamber, west wall 1</td>
<td>medium</td>
<td>lyre 1</td>
<td>head proportionate to body</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>at or above dewclaw</td>
<td>round end</td>
<td>ox</td>
<td>m 1w3-3yo ung ox</td>
<td>walking/being⇌long-homed wearing blanket</td>
<td>NA</td>
<td></td>
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<td></td>
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<tr>
<td>Nebet Unis Cemetery (Munro 1993, pl. 17) fourth register</td>
<td></td>
<td></td>
<td></td>
<td>inspection</td>
<td>C, south, western section 1</td>
<td>medium</td>
<td>crescent</td>
<td>head proportionate to body</td>
<td>moderate</td>
<td>not present</td>
<td>straight</td>
<td>NA</td>
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<td>NA</td>
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<td>straight</td>
<td>at or above dewclaw</td>
<td>flat end</td>
<td>ox</td>
<td>walking/being⇌NA</td>
<td>NA</td>
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<td>flat end</td>
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<td>NA</td>
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<td>NA</td>
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<td>absent to small</td>
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<td>b)</td>
<td>NA</td>
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<td>flat end</td>
<td>ox</td>
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<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-Thoracic Hump</td>
<td>Back Shape</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
<td>Textual Evidence of Cattle</td>
<td>Activity of Cattle</td>
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<td>c) 1.5</td>
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<td>c) long</td>
<td>a-c) lyre</td>
<td>i</td>
<td>a-c) head proportionate to body</td>
<td>a-b) not to small</td>
<td>b) NA</td>
<td>c) concave</td>
<td>a-c) NA</td>
<td>a-b) at or above dewclaw ws</td>
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<td>b) 1.1</td>
<td>c) 1.4</td>
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<td>d) NA</td>
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<td>(Simpson 1992, pl. E) (MFA 04.1761) second register</td>
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<td>inspection</td>
<td>south wall of east mastaba chapel</td>
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<td>b) 1.6</td>
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<td>a-c) hornles</td>
<td>a) round head</td>
<td>i) d) NA</td>
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<td>b) 1.7</td>
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<td>i) a-b) hornles</td>
<td>a-b) di</td>
<td>a-b) not</td>
<td>concave</td>
<td>a-b) at or above dewclaw ws</td>
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<td>a-b) di</td>
<td>a-b) not</td>
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<td>a-b) at or above dewclaw ws</td>
<td>a-b) flat end</td>
<td>a-b) ox</td>
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<td>deform ed</td>
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<td>at or above dewclaw ws</td>
<td>round end</td>
<td>ox</td>
<td>m 137-30 ung ox’</td>
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<td>1.28</td>
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<td>lyre</td>
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<td>a-b) small head</td>
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<td>concave</td>
<td>at or above dewclaw ws</td>
<td>round end</td>
<td>ox</td>
<td>m 137-30 ung ox’</td>
<td>bending back towards leg</td>
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<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn</th>
<th>Horn</th>
<th>General Skull Morphology</th>
<th>Cervico-thoracic hump</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Notes</th>
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<td>Ihy: reused by Sheshe</td>
<td>Sheshe</td>
<td>Idut</td>
<td>Cemetery</td>
<td>2003, pl. 66</td>
<td>end of 5th Dynasty - early 6th Dynasty (Kanawati and Abder-Raziq 2003)</td>
<td>Room 9, south wall</td>
<td>1.6</td>
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<td>Cemetery</td>
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<td>Room 9, east wall</td>
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<td>long</td>
<td>(left to right) a) extra-long</td>
<td>a) diagona l</td>
<td>b) deform ed c-d</td>
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<td>a)</td>
<td>b) absent to small b-d</td>
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<td>Teti</td>
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<td>1997, pl. 43b</td>
<td>offering</td>
<td>6th Dynasty (Kanawati and Hassan 1997)</td>
<td>Doorway between rooms II-III, north thickness</td>
<td>1.9</td>
<td>extra-long</td>
<td>l</td>
<td>head proportion to body</td>
<td>modera te</td>
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<td>6th Dynasty (Kanawati and Hassan 1997)</td>
<td>Doorway between rooms II-III, south thickness</td>
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<td>extra-long</td>
<td>l</td>
<td>head proportion to body</td>
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<th>X</th>
<th>Horn protraction Angle</th>
<th>General skull morphology</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity of cattle</th>
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<td>Nikauisesi Tomb 51b</td>
<td>Doorway between rooms I-II</td>
<td>early 6th Dynasty</td>
<td>2000, 17-23</td>
<td>door</td>
<td>1.8</td>
<td>(left to right, front to back) a-b) extra-long</td>
<td>a-b) diastema</td>
<td>a-b) small head</td>
<td>a-b) present b) NA</td>
<td>a) at or above dewclaws b) NA</td>
<td>a) flat end b) NA</td>
<td>a) ox b) NA</td>
<td>(most likely ox)</td>
<td>jnt m n jw3 'nu m3 'bringing the young oxen for the viewing' (Kanawati and Abder-Raziq 2000, 42).</td>
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<tr>
<td>Nikauisesi Tomb 51b</td>
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<td>early 6th Dynasty</td>
<td>2000, 17-23</td>
<td>door</td>
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<td>(left to right, back to front) a-b) long</td>
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<td>a-b) small head</td>
<td>a-b) modesta te</td>
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<td>a) flat end b) NA</td>
<td>a) NA</td>
<td>b) ox</td>
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<td>South wall</td>
<td>6th Dynasty</td>
<td>1998, 40-41</td>
<td>front</td>
<td>1.5</td>
<td>long</td>
<td>lyre 1</td>
<td>small, dished head</td>
<td>absent to small</td>
<td>present</td>
<td>flat end</td>
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<td>NA</td>
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<td>Offering room, east wall</td>
<td>6th Dynasty</td>
<td>1999, 15-16</td>
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<td>absent to small NA</td>
<td>at or above hocks</td>
<td>round end</td>
<td>ox</td>
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<td>Offering room, west wall, north of false door niche</td>
<td>6th Dynasty</td>
<td>1999, 15-16</td>
<td>niche</td>
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<td>present</td>
<td>concave at or above the dewclaws</td>
<td>round end</td>
<td>ox</td>
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<td>walking</td>
<td>neck scarf</td>
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<td>Hesi Tomb 61</td>
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<td>6th Dynasty</td>
<td>1999, 15-16</td>
<td>niche</td>
<td>0</td>
<td>EXCEP TION: PROFI L OF LONG HORNS NA</td>
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<td>present</td>
<td>concave at or above the dewclaws</td>
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<td>ox</td>
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<td>Room 2, south wall</td>
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<td>2006, 2006-16-17</td>
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<td>homol ses round head</td>
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<td>Horn Proportions</td>
<td>Horn Morphology</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic hump</td>
<td>Back Shape</td>
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<td>1971, pl. 16, 17</td>
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<td>b-c) 1.7</td>
<td>(Left to right, back to front)</td>
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<td>a-c) long</td>
<td>a-c) b-d)</td>
<td>a-c) c-d) concave</td>
<td>a-b) NA</td>
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<td>a-b) ox</td>
<td>m</td>
<td>iw3-'yo ung ox*</td>
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<td>1971, pl. 16, 17</td>
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<td>a-c) long</td>
<td>a-c) b-d)</td>
<td>a-c) c-d) concave</td>
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<td>6th Dynasty</td>
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<td>1938a, 5)</td>
<td>exception</td>
<td>Chamber A13, East wall, scene 2</td>
<td>a-j) 6</td>
<td>a-i) v-shaped horns</td>
<td>a-i) a-j) small head</td>
<td>a-i) b-d)</td>
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<td>a-b)</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b) at above dewlap</td>
<td>a-b)</td>
<td>a-b) flat end</td>
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<td>a-b)</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b) at above dewlap</td>
<td>a-b)</td>
<td>a-b) flat end</td>
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<td>1938a, 5)</td>
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<td>horizontal</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b)</td>
<td>at above dewlap</td>
<td>a-b)</td>
<td>flat end</td>
<td>ox</td>
</tr>
<tr>
<td>Nefer and Kahay</td>
<td>5th Dynasty</td>
<td>(Moussa and Altenmüller 1971, pl. 6)</td>
<td>1971, 18)</td>
<td>offering</td>
<td>east wall A of chapel</td>
<td>a-b) c) 1.5</td>
<td>(left to right, top to bottom)</td>
<td>a-b) small head</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b) at above dewlap</td>
<td>a-b)</td>
<td>flat end</td>
<td>ox</td>
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<td>1971, 18)</td>
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<td>south wall A of chapel</td>
<td>a-b) 1.5</td>
<td>(left to right) a-b) long</td>
<td>a-b) diaga l</td>
<td>a-b) small head</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b)</td>
<td>a-b) at above dewlap</td>
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<td>Horn Size</td>
<td>Horn Shape</td>
<td>Horn Protrusion Angle</td>
<td>General Skull Morphology</td>
<td>Dewlap Size</td>
<td>Cervico-thoracic Hump</td>
<td>Tail Length</td>
<td>Switch Shape</td>
<td>Sex</td>
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<td>-------------</td>
<td>--------------</td>
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<td>---------------------</td>
</tr>
<tr>
<td>Kagemni</td>
<td>LS 10</td>
<td></td>
<td></td>
<td>exception</td>
<td>west wall, room 4</td>
<td>0.79</td>
<td>short</td>
<td>lyre 2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Ptahhetep</td>
<td>D 64 - west of Step Pyramid ep II</td>
<td>(Paget and Pire 1989, pl. 31) third register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>south wall, west half</td>
<td>a) 88 b) 1.1 c) 81 d) 81 e) 7 f) 1 g) 1.1</td>
<td>(left to right) a-b) medium b) short f-j) medium</td>
<td>a-i) lyre 2 j) deformed</td>
<td>a-j) j) small head</td>
<td>a-j) j) small head</td>
<td>a-j) j) small head</td>
<td>at or above dewclaws b-f) NA g) at or above dewclaws h-j) NA</td>
<td>flat end b) round end</td>
<td>a-g) NA h) ox i) i w3-ox' a-b) slip (w) n iw3 h mdwt-t he best of stalled cattle g) walking/bein'g leading j) rope collar b)</td>
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<td>a) 1.1 b) 2</td>
<td>(left to right) a) medium b) extra-long</td>
<td>a-b) diagonale</td>
<td>a-b) small head</td>
<td>a-b) not present</td>
<td>a-b) concave</td>
<td>at or above dewclaws</td>
<td>flat end a-b) ox</td>
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<td>a) rope collar b)</td>
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<td>(Davies 1901, pl. 14)</td>
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<td>chapel, east wall, right half</td>
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<td>small head</td>
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<td>present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end bull</td>
<td>NA</td>
<td>fording river</td>
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<td>D 64</td>
<td>(Davies 1901, pl. 21) sixth register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>chapel, south bay, west wall</td>
<td>d) NA</td>
<td>a-c) 2.5</td>
<td>c) lyre 1 d) hornless</td>
<td>a-c) 2 d) hornless</td>
<td>a-c) 2 d) hornless</td>
<td>a-c) 2 d) hornless</td>
<td>at or above dewclaws</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
<td>walking/bein'g led</td>
<td>slender, muscul ar body</td>
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<td>(Davies 1901, pl. 21) fifth register</td>
<td>5th Dynasty (OEE database)</td>
<td>inspection</td>
<td>chapel, south bay, west wall</td>
<td>2.4</td>
<td>extra-long</td>
<td>lyre 1</td>
<td>small head</td>
<td>a) small</td>
<td>a-d) small</td>
<td>present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
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<tr>
<td>Akhethetep</td>
<td>D 64</td>
<td>(Davies 1901, pl. 21) fourth register</td>
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<td>chapel, south bay, west wall</td>
<td>a) 2.5 b) 1.85</td>
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<td>at or above dewclaws</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
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<td>a) rope collar b)</td>
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<tr>
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<td>inspection</td>
<td>chapel, south bay, west wall</td>
<td>a-c) 1.6</td>
<td>a-c) lyre 1</td>
<td>a-c) small head</td>
<td>a-c) small head</td>
<td>a-c) small head</td>
<td>a-c) small head</td>
<td>at or above dewclaws b-c) NA</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
<td>walking/bein'g led</td>
<td>a) collar c) long scarf</td>
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<td>lyre 2</td>
<td>small head</td>
<td>not present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
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<td>chapel, south bay, west wall</td>
<td>1.6</td>
<td>long</td>
<td>lyre 1</td>
<td>head proportion to skull</td>
<td>head proportion to body</td>
<td>not present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end ox</td>
<td>m w3-’yo ung ox'</td>
<td>walking/bein'g led</td>
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**Chapel of Kagemni: Scene Details.**


**Bibliography**
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<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity of cattle</th>
<th>Notes</th>
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<td>a) 1.6</td>
<td>a-c) long</td>
<td>a-b) lyre 1 c) deform ed l</td>
<td>a-c) diagnosta c) small head</td>
<td>a-c) not present</td>
<td>a-c) straight</td>
<td>a-c) at or above dewlap ws</td>
<td>a-c) flat end</td>
<td>a-c) ox</td>
<td>a-c) at or above dewlap ws</td>
<td>a-c) flat end</td>
<td>a-c) ox</td>
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<td>a) NA</td>
<td>b) iw3’-ox’</td>
<td>c) m</td>
<td>iw3-‘yo ung ox’</td>
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<td>inspection chapel</td>
<td>a-d) extra-long</td>
<td>a-d) lyre l</td>
<td>a-d) diagnosta a-d) small head</td>
<td>a-d) not present</td>
<td>a-b) NA</td>
<td>c) straight</td>
<td>d) concav e</td>
<td>a-b) at or above dewlap ws</td>
<td>a-b) flat end</td>
<td>a-d) ox</td>
<td>a-b) at or above dewlap ws</td>
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<td>a-b) ox</td>
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<td>c) iw3-’ox’</td>
<td>d) iw3-’ox’</td>
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<td>a-b) lyre 2</td>
<td>a-b) diagnosta a-b) small head</td>
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<td>a-b) straight</td>
<td>a-c) at or above dewlap ws</td>
<td>a-b) round end b) flat end</td>
<td>a-b) ox</td>
<td>a-b) walking/bein</td>
<td>g led</td>
<td>a-b) ox</td>
<td>iw3’-ox’</td>
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<td>g led</td>
<td>b) collar</td>
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<td>a-g) extra-long</td>
<td>a-g) lyre 1</td>
<td>a-g) head proportion a-g) a-to the body</td>
<td>a-g) not present</td>
<td>d-f) straight</td>
<td>g) NA</td>
<td>a-b) at or above dewlap ws</td>
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<td>a-c) ox</td>
<td>c) straight</td>
<td>d-e) straight</td>
<td>f) present</td>
<td>d-e) NA</td>
<td>f) long</td>
<td>g) NA</td>
<td>a-g) walking/bein</td>
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<td>a) 1.2</td>
<td>b) NA</td>
<td>c) long</td>
<td>a) a) lyre 1 b) a) horns medium a) flat head c) lyre 1 l</td>
<td>a) a-diagona b) flat head c) diagonal a) to the body</td>
<td>a) NA</td>
<td>a-c) straight</td>
<td>a-c) at or above dewlap ws</td>
<td>a-c) flat end</td>
<td>a-c) ox</td>
<td>a-c) at or above dewlap ws</td>
<td>a-c) flat end</td>
<td>a-c) ox</td>
<td>m</td>
<td>b) m</td>
<td>iw3’-ox’</td>
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<td>KaiemheNA</td>
<td>(McFarlane 2004, pl. 46)</td>
<td>5th-6th Dynasty (OEE database)</td>
<td>exception</td>
<td>a) .76</td>
<td>b) 1</td>
<td>a) crescent a) short b) medium c) very short d) long</td>
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<td>a-b) absent to small</td>
<td>a-b) concave</td>
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<td>a-b) flat end</td>
<td>a-b) ox</td>
<td>a-b) at or above dewlap ws</td>
<td>a-b) flat end</td>
<td>a-b) ox</td>
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<td>seige scene-asics (Mourad 2011, 136)</td>
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## Appendix H- Representations of cattle from Meidum

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<th>Horn Shape</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence-cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Rahotep Mastaba 6</td>
<td>(Petrie 1892, pl. 9)</td>
<td>4th Dynasty inspection</td>
<td>south side of entrance passage</td>
<td>1.4</td>
<td>long</td>
<td>lyre 1</td>
<td>straight profile/ head proportion to body</td>
<td>absent to small</td>
<td>present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>ox</td>
<td>Male bovine being led forward by a single man. mDwt pr n Dt'-the stock-farms of the house of eternity' (Petrie 1892, 37)</td>
<td>&quot;...the ox led forward, and indicated by three tethers or hobbles formed of a loop of rope passing through two holes in a piece of wood. It seems to be used here as a determination for the place for tame animals, in contrast to the wild ones above&quot; (Petrie 1892, 23).</td>
<td>NA</td>
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<td>Atet Mastaba 16</td>
<td>(Petrie 1892, pl. 24)</td>
<td>4th Dynasty offering</td>
<td>north side of front</td>
<td>1</td>
<td>medium</td>
<td>lyre 1</td>
<td>vertical</td>
<td>small head</td>
<td>moderate</td>
<td>present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>ox</td>
<td>tied to anchor in the ground</td>
<td>NA</td>
<td>white with black spots;</td>
<td></td>
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<tr>
<td>Atet Mastaba 16</td>
<td>(Petrie 1892, pl. 27)</td>
<td>4th Dynasty offering</td>
<td>north side of chamber</td>
<td>1.3</td>
<td>long</td>
<td>lyre 1</td>
<td>straight profile/ head proportion to body</td>
<td>absent to small</td>
<td>not present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>ox</td>
<td>Bovine walking among other tame animals (Petrie 1892, 27)</td>
<td>NA</td>
<td>White with black spots; green horns</td>
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### Appendix I- Representations of cattle from Deshasha

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<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Develop Size</th>
<th>Cervico-thoracic Hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
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<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
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<tr>
<td>Inti</td>
<td>NA</td>
<td>(Kanawati and McFarlane 1993, pl. 51) 6th-7th Dynasty (Kanawati and McFarlane 1993, 17-19)</td>
<td>Offering</td>
<td>west wall, south of serdab</td>
<td>1.3</td>
<td>long</td>
<td>diaphanous small head</td>
<td>not present</td>
<td>concave</td>
<td>at or above dewclaw</td>
<td>flat end</td>
<td>ox</td>
<td>m w3</td>
<td>walking</td>
<td>number-113</td>
<td>NA</td>
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<tr>
<td>Inti</td>
<td>NA</td>
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<td>Exception</td>
<td>Chapel-wall north wall</td>
<td>NA</td>
<td>short</td>
<td>lyre 1</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>not present</td>
<td>NA</td>
<td>NA</td>
<td>cow</td>
<td>walking</td>
<td>cow with medium lyre-shaped horns; other two cows in the register have long horns</td>
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<tr>
<td>Ituti</td>
<td>Shedu NA</td>
<td>(Kanawati and McFarlane 1993, pl. 51) 6th Dynasty (Kanawati and McFarlane 1993, 1993, 42-44)</td>
<td>Inspection</td>
<td>Chapel-west wall-north of shrine</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
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<tr>
<td>Ituti</td>
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<td>Inspection</td>
<td>Chapel-west wall-north of shrine</td>
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<td>NA</td>
<td>NA</td>
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<td>NA</td>
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### Bibliography


Shedu and Others. The Australian Egyptology Sydney: The Australian Centre for Centre for Egyptology: Reports 5.
## Appendix J- Representations of cattle from Tehna

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<th>Horn Shape</th>
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<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
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<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence- cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
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<td>Nikaiankh I</td>
<td>Tomb 13</td>
<td>(Thompson 2014, pl. 54)</td>
<td>5th Dynasty (Thompson 2014, 26)</td>
<td>offering</td>
<td>west wall</td>
<td>NA</td>
<td>hornless round head</td>
<td>NA</td>
<td>NA</td>
<td>in proportion to body</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>author claims this bovine is a calf and that Hrj-Dba means hand-reared calf (Thompson 2014, 35)</td>
<td>animal is being restrained by many men (Thompson 2014, 36)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Nikaiankh I</td>
<td>Tomb 13</td>
<td>(Thompson 2014, pl. 55)</td>
<td>5th Dynasty (Thompson 2014, 26)</td>
<td>offering</td>
<td>west wall</td>
<td>0.57</td>
<td>short</td>
<td>deform ed</td>
<td>horizontal small head</td>
<td>absent to small</td>
<td>NA</td>
<td>NA</td>
<td>flat end</td>
<td>ox</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## Appendix K- Representations of cattle from Meir

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervicothoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Textual Evidence-cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni-ankh-Pepi</td>
<td>A 1</td>
<td>(Blackman 1953, pl. 11)</td>
<td>6th Dynasty (Blackman, 1914, 18)</td>
<td>offering</td>
<td>Room A: north wall: west scene</td>
<td>NA</td>
<td>hornless, round head</td>
<td>NA</td>
<td>NA</td>
<td>slightly dished face, head proportionate to body</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>at or above the hocks</td>
<td>round</td>
<td>NA</td>
<td>iw3</td>
<td>Being led by a man</td>
<td>no genitalia depicted</td>
</tr>
<tr>
<td>Pepyankh the Black</td>
<td>A 2</td>
<td>(Kanawati 2014, pl. 82) third register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>cattle</td>
<td>Room 3, south wall</td>
<td>a) 1.7 b) 1.71 c) NA</td>
<td>(Left to right) a) b) protruding c) hornless s</td>
<td>a-b) lyre 1 c) hornless s flat head</td>
<td>a-b) diagonal I b) NA</td>
<td>a-c) straight profile/ head in proportion to the body</td>
<td>a) moderate be-c) absent to small</td>
<td>a-c) not present</td>
<td>straight</td>
<td>a-c) below dewclaws</td>
<td>a) NA</td>
<td>b-c) flat</td>
<td>c) ox</td>
<td>a) cow b) bull c) ox</td>
<td>vertical line of text in front of tomb owner: m33 k3w n jw3 (Kanawati 2014, 35)</td>
</tr>
<tr>
<td>Pepyankh the Black</td>
<td>A 2</td>
<td>(Kanawati 2014, pl. 82) second register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>cattle</td>
<td>Room 3, south wall</td>
<td>a) 1.23 b) 1.18 c) 1.16</td>
<td>(Left to right) a) b) protruding c) hornless s flat head</td>
<td>a-b) lyre 1 c) hornless s flat head</td>
<td>a-b) diagonal I b) NA</td>
<td>a-c) straight profile/ head in proportion to the body</td>
<td>a) moderate be-c) absent to small</td>
<td>a-c) not present</td>
<td>straight</td>
<td>a-c) below dewclaws</td>
<td>a) NA</td>
<td>b-c) flat</td>
<td>c) ox</td>
<td>a) cow b) bull c) ox</td>
<td>vertical line of text in front of tomb owner: m33 k3w n jw3 (Kanawati 2014, 35)</td>
</tr>
<tr>
<td>Pepyankh the Black</td>
<td>A 2</td>
<td>(Kanawati 2014, pl. 82) first register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>cattle</td>
<td>Room 3, south wall</td>
<td>a) 1.47 b) 1.7 c) NA</td>
<td>(Left to right) a) long b) protruding c) hornless s flat head</td>
<td>a-b) lyre 1 c) hornless s flat head</td>
<td>a-b) diagonal I b) NA</td>
<td>a-b) absent to small</td>
<td>a-b) not present</td>
<td>a-b) concav e</td>
<td>a-b) below dewclaws</td>
<td>a-b) flat</td>
<td>c) ox</td>
<td>a) cow b) bull c) ox</td>
<td>a) m n iw3-long and ox' b) ng3w longhorned bull 1,400 'long-horned bull 1,400' PROBLE M HERE BECAUSE E IN SECOND REGISTER R THERE IS SHORT HORNED LABELLED NGAW c) ri3w 500 'young ox, 500' (Kanawati 2014, 35) a) cow b) bull c) ox</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Notes
- a) m n iw3-long and ox' b) ng3w longhorned bull 1,400 'long-horned bull 1,400' PROBLE M HERE BECAUSE E IN SECOND REGISTER R THERE IS SHORT HORNED LABELLED NGAW c) ri3w 500 'young ox, 500' (Kanawati 2014, 35)
- a) walking and being guided by man b) walking with its tongue sticking out c) walking along the small cattle from his town's (Kanawati 2014, 35)
<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Image Reference</th>
<th>Date</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn Size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence-Category Types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pepyankh the Black</td>
<td>(Kanawati 2014, pl. 92) third register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>Room 4, east wall, south panel</td>
<td>a) 1.5 b) 1.6 c) 1.4</td>
<td>(Left to right, back to front) a-c) long</td>
<td>a-c) diagonal l</td>
<td>a-b) straight profile/ head in proportion to the body c) NA</td>
<td>a-c) not present</td>
<td>c) below dewlap ws</td>
<td>a-b) NA c) flat end</td>
<td>a-b) NA flat end</td>
<td>a-b) cow</td>
<td>(from text) c) ox</td>
<td>a-c) walking</td>
<td>a) 'jt 10,100-`co w, 10,100' b) jdt-j'm brw c) m n lw3-long -horned ox' (Kanawati 2014, 54)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Pepyankh the Black</td>
<td>(Kanawati 2014, pl. 92) second register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>Room 4, east wall, south panel</td>
<td>a) 1.6 b) 1.6 c) 1.6 d) 1.23</td>
<td>(Left to right, back to front) a-c) long d) medium</td>
<td>a-c) diagonal l</td>
<td>a-c) small head d) head proportionate to body c) NA</td>
<td>a-b) NA c) straight d) at above dewlap ws</td>
<td>a-b) NA d) at above dewlap ws</td>
<td>a-b) NA c) round end</td>
<td>a-b) ox</td>
<td>a-c) walking</td>
<td>a) walking b) walking c) fighting d) fighting</td>
<td>Colors not very clear from images, only clear and obvious colors mentioned here</td>
<td>a-c) black and white d) NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pepyankh the Black</td>
<td>(Kanawati 2014, pl. 92) first register</td>
<td>6th Dynasty (Kanawati 2014, 18)</td>
<td>Room 4, east wall, south panel</td>
<td>a) 83 b) 1.08 c) 0.84 d) 0.83</td>
<td>(Left to right) a 2 b) short b) lyre 1 c) d) medium l 2</td>
<td>a-d) diagonal l</td>
<td>a) crescent b) to small d) head profile/ small heads</td>
<td>a) present b) not present c) present d) present</td>
<td>a-c) not present d) at above dewlap ws</td>
<td>a-b) NA b-d) flat end</td>
<td>a-b) flat end</td>
<td>a) bull b) cow c) bull d) bull</td>
<td>a) k3-bull b) jdt-j'm cow c) NA d) NA</td>
<td>a) walking b) fighting c) fighting d) fighting</td>
<td>Colors not very clear from images, only clear and obvious colors mentioned here &quot;...who leads a young ox&quot; &quot;1-m lw3/it. The fem. ending t is probably a mistake for the sculptor, for the animal is surely a male. (Blackman 1924, 31)</td>
<td>a-c) black and white d) NA</td>
<td></td>
</tr>
<tr>
<td>Pepyankh the Middle</td>
<td>(Blackman 1924, pl. 9)</td>
<td>6th Dynasty (Blackman 1914, 6)</td>
<td>Main room: north wall</td>
<td>homesles s flat head</td>
<td>homelies s flat head</td>
<td>in proportion to the skull</td>
<td>absent not present</td>
<td>straight</td>
<td>at or above dewlap ws</td>
<td>flat end</td>
<td>NA</td>
<td></td>
<td>m lw3t-youn g ox' see note</td>
<td>walking</td>
<td>m lw3-`young ox'</td>
<td>walking (being led)</td>
<td>NA</td>
</tr>
<tr>
<td>Pepyankh the Middle</td>
<td>(Blackman 1924, pl. 12)</td>
<td>6th Dynasty (Blackman 1914, 6)</td>
<td>Main room: west wall: south side of Facade-Stela</td>
<td>homesles s round head</td>
<td>homesle s round head</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>walking</td>
<td>m lw3-`young ox'</td>
<td>walking (being led)</td>
<td>NA</td>
</tr>
<tr>
<td>Pepyankh the Middle</td>
<td>(Blackman 1924, pl. 16)</td>
<td>6th Dynasty (Blackman 1914, 6)</td>
<td>Main room: east wall: south of entrance: middle and south end</td>
<td>average (left to right) a-n) long</td>
<td>average (left to right) a-n) long</td>
<td>a-n) lyre 1</td>
<td>a-n) not present d) at above dewlap ws</td>
<td>a-c) NA d) at above dewlap ws f-i) NA</td>
<td>a-c) NA d) at above dewlap ws h-k-l) NA</td>
<td>a-b) NA c) flat end</td>
<td>a-c) flat end b) NA d) flat end c) NA j</td>
<td></td>
<td>a-c) NA d) at above dewlap ws f-i) NA</td>
<td>a-c) NA d) at above dewlap ws f-i) NA</td>
<td>a-c) NA d) at above dewlap ws f-i) NA</td>
<td>a-c) NA d) at above dewlap ws f-i) NA</td>
<td>All animals are walking while being guided towards the tomb owner (from text)</td>
</tr>
</tbody>
</table>

**Bibliography**

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>Horn Protrusion Angle</th>
<th>Horn Shape</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence-cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pepyan kh the Middle</td>
<td>D2</td>
<td>(Blackman 1924, pl. 16) second register</td>
<td>6th Dynasty (Blackman 1914, 6)</td>
<td>inspection</td>
<td>Main room: east wall; south of entrance: middle and south end</td>
<td>(left to right, back to front) a-d) diaconal</td>
<td>a-d) diayonal</td>
<td>a) concave profile b) small head/concave face c) straight profile d) small head</td>
<td>a) NA b) absent to small c) moderate d) absent</td>
<td>a-b) not present to c) NA d) present</td>
<td>a) NA b) straight c) NA d) concave</td>
<td>a-b) at or above the dewclaws</td>
<td>a-d) NA</td>
<td>ox</td>
<td>iw3 - 'ox'</td>
<td>all animals are walking while being guided towards the tomb owner</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Niankh-Pepy the Black</td>
<td>A1</td>
<td>(Kanawati et al. 2015, pl. 64) third register</td>
<td>6th Dynasty (Kanawati et al. 2015, 20)</td>
<td>offering</td>
<td>room 1, west wall, south panel</td>
<td>a) .84 b) 1.2c) .93</td>
<td>a-b) medium ed</td>
<td>a-b) head proportionate to body b) absent to c) present d) present</td>
<td>a-b) present b) absent to c) NA d) present</td>
<td>a-b) below the dewclaws</td>
<td>a-b) concave b) convex profile c) deformed face, small head</td>
<td>a-b) at or above the dewclaws</td>
<td>a-b) flat end b) ox c) a-b) iw3</td>
<td>walking</td>
<td>a-b) neck scarves</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niankh-Pepy the Black</td>
<td>A1</td>
<td>(Kanawati et al. 2015, pl. 64) third register</td>
<td>6th Dynasty (Kanawati et al. 2015, 20)</td>
<td>offering</td>
<td>room 1, west wall, south panel</td>
<td>a) .84 b) 1.25</td>
<td>a-b) medium ed</td>
<td>a-b) diayonal</td>
<td>a) convex profile b) deformed face, small head</td>
<td>a-b) present b) absent to c) NA d) present</td>
<td>a-b) at or above the dewclaws</td>
<td>a-b) NA a-b) ox c) a-b) iw3</td>
<td>walking</td>
<td>a-b) neck scarves</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niankh-Pepy the Black</td>
<td>A1</td>
<td>(Kanawati et al. 2015, pl. 67) second register</td>
<td>6th Dynasty (Kanawati et al. 2015, 20)</td>
<td>offering</td>
<td>room 1, north wall, west panel</td>
<td>NA NA NA NA</td>
<td>head proportionate to body b) absent to c) present d) present</td>
<td>concave</td>
<td>flat end b) ox c) iw3</td>
<td>walking</td>
<td>blanket</td>
<td>NA</td>
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<td></td>
<td></td>
<td></td>
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### Appendix L - Representations of cattle from Deir el-Gebrâwi

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibi 8</td>
<td>8</td>
<td>Offering (first register)</td>
<td>1902</td>
<td>Offering</td>
<td>east wall</td>
<td>a) 1.86</td>
<td>b) 1.9</td>
<td>c) NA</td>
<td>(left to right) a)</td>
<td>horns long</td>
<td>b) head in proportion to body</td>
<td>c) absent to small</td>
<td>a) NA</td>
<td>b) concave</td>
<td>a)</td>
<td>at or above dewlap</td>
<td>a) ox</td>
<td>walking</td>
<td>b-c) NA</td>
<td></td>
</tr>
<tr>
<td>Ibi 8</td>
<td>8</td>
<td>Offering (second register)</td>
<td>1902</td>
<td>Offering</td>
<td>east wall</td>
<td>a) NA</td>
<td>b) 2.5</td>
<td>d) 1.21</td>
<td>(left to right, front to front) a)</td>
<td>horns long</td>
<td>b) head flat</td>
<td>c) absent to small</td>
<td>a) NA</td>
<td>b) present</td>
<td>a)</td>
<td>at or above dewlap</td>
<td>a) cow</td>
<td>pulling plow</td>
<td>a) NA</td>
<td></td>
</tr>
<tr>
<td>Ibi 8</td>
<td>8</td>
<td>Offering (first register)</td>
<td>1902</td>
<td>Offering</td>
<td>north wall, west side</td>
<td>a-b) NA</td>
<td>d) medium</td>
<td>a-d) 1.8</td>
<td>(left to right) a)</td>
<td>horns long</td>
<td>b) head flat</td>
<td>c) present</td>
<td>a-b) straight</td>
<td>a)</td>
<td>at or above dewlap</td>
<td>a) cow</td>
<td>walking</td>
<td>b-c) NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibi 8</td>
<td>8</td>
<td>Offering (second register)</td>
<td>1902</td>
<td>Offering</td>
<td>north wall, west side</td>
<td>a) NA</td>
<td>b) 8</td>
<td>c) 1.8</td>
<td>(left to right, SECOND D AND FIFTH CATTLE EXCLUDED) a)</td>
<td>horns long</td>
<td>b) head flat</td>
<td>c) present</td>
<td>a-b) straight</td>
<td>a-c) at</td>
<td>at or above dewlap</td>
<td>a) bull</td>
<td>fat</td>
<td>b-c) NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibi 8</td>
<td>8</td>
<td>Offering (first register)</td>
<td>1902</td>
<td>Offering</td>
<td>north wall, west side</td>
<td>NA</td>
<td>extra-long</td>
<td>extra-long</td>
<td>(left to right)</td>
<td>horns round</td>
<td>b) head in proportion to body</td>
<td>c) absent to small</td>
<td>a) NA</td>
<td>b) concave</td>
<td>a-c) at</td>
<td>at or above dewlap</td>
<td>flat end</td>
<td>being milked</td>
<td>back legs tied together</td>
<td>NA</td>
</tr>
</tbody>
</table>

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**Note:** The data is presented in a tabular format, with columns for various attributes such as Horn size, Horn Shape, Horn Protrusion Angle, General Skull Morphology, Dewlap Size, Cervico-thoracic hump, Back Shape, Tail Length, Switch Shape, Sex, Textual Evidence of cattle types, Activity of cattle, and Notes. The entries provide detailed descriptions and measurements of different cattle representations, along with their respective locations and activities. The data is sourced from the Rock Tombs of Deir el-Gebrâwi Volume I, with references to the Survey of Egypt: Memoir 11 and the London: Egypt Exploration Fund. The specific sections and figures cited in the text are not included in the table, focusing instead on the tabular representation of the data.
<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence of cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemre: Isi</td>
<td>S 12</td>
<td>(Kanawati 2005, pl. 64) 6th Dynasty (Kanawati 2005, 40)</td>
<td>offering</td>
<td>Chapel: east wall</td>
<td>1.5</td>
<td>long</td>
<td>lyre</td>
<td>diagonal</td>
<td>head proportionate to body</td>
<td>absent to small</td>
<td>NA</td>
<td>straight</td>
<td>flat end</td>
<td>ox</td>
<td>m</td>
<td>young</td>
<td>being led</td>
<td>lean body</td>
<td>NA</td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 63) third register, second set of cattle 6th Dynasty (Kanawati 2013, 18-25)</td>
<td>exception</td>
<td>Chapel, east wall, north</td>
<td>a</td>
<td>53</td>
<td>1.35</td>
<td>NA</td>
<td>a</td>
<td>a-c)</td>
<td>NA</td>
<td>a-b)</td>
<td>NA</td>
<td>c)</td>
<td>not present</td>
<td>a-c)</td>
<td>a-c)</td>
<td>NA</td>
<td>a-c)</td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 64) first register 6th Dynasty (Kanawati 2013, 18-25)</td>
<td>offering</td>
<td>Chapel, east wall, south</td>
<td>1.06</td>
<td>medium</td>
<td>lyre</td>
<td>diagonal</td>
<td>big head</td>
<td>absent to small</td>
<td>not present</td>
<td>concave</td>
<td>at or above dewclaws</td>
<td>flat end</td>
<td>ox</td>
<td>NA</td>
<td>being led</td>
<td>fat</td>
<td>white with yellow horns</td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 67) second register 6th Dynasty (Kanawati 2013, 18-25)</td>
<td>offering</td>
<td>Offering recess, north wall</td>
<td>1.5</td>
<td>long</td>
<td>lyre</td>
<td>diagonal</td>
<td>proportionate to body</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>being led</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 71) 6th Dynasty (Kanawati 2013, 18-25)</td>
<td>offering</td>
<td>Chapel: south wall, west section</td>
<td>NA</td>
<td>long</td>
<td>lyre</td>
<td>diagonal</td>
<td>NA</td>
<td>absent to small</td>
<td>not present</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>ox</td>
<td>NA</td>
<td>walking</td>
<td>NA</td>
<td>white with dark spots (unable to say definitively what color these spots are from picture)</td>
</tr>
</tbody>
</table>

References:
<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn Size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence-cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 74)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>Chapel, north wall, west section</td>
<td>a) 1.9 b) NA</td>
<td>a-b) lyre 1</td>
<td>a-b) diatanta</td>
<td>a-b) absent to small</td>
<td>a) b) present b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>walking</td>
<td>vertical line of text: Tnw mmrmt 24,000…’The count of cattle, 24,000…’ (Kanawati 2013, 42)</td>
<td>white with brown/red horns and hooves</td>
<td></td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 74)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>Chapel, north wall, west section</td>
<td>a-b) NA</td>
<td>a-b) lyre 1</td>
<td>a-b) hornles s round head</td>
<td>a-b) NA</td>
<td>a) not present b) present</td>
<td>a) at or above hocks</td>
<td>b) NA</td>
<td>a) flat end b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>walking</td>
<td>b has unique horns</td>
<td>white with small brown/red spots</td>
<td></td>
</tr>
<tr>
<td>Djau/Shemai and Djau</td>
<td>S 12</td>
<td>(Kanawati 2013, pl. 74)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>6th Dynasty (Kanawati 2013, 19-25)</td>
<td>Chapel, north wall, west section</td>
<td>a) 1.5 b) 1.5</td>
<td>a-b) lyre 1</td>
<td>a-b) diatanta</td>
<td>a-b) absent to small</td>
<td>a) b) present b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>being led/ walking</td>
<td>NA</td>
<td>white with brown horns and hooves</td>
<td></td>
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</tbody>
</table>
### Appendix M- Representations of cattle from Hagarsa

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Location in Tomb</th>
<th>X Horn size</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>General Morphology</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Protrusion Angle</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Textual Evidence - cattle types</th>
<th>Activity</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mery</td>
<td>C2</td>
<td>(Kanawati 1993, pl. 43)</td>
<td>8th Dynasty</td>
<td>Chapel-south wall</td>
<td>a) 1.5 b-e), 91.95</td>
<td>(TOP TO BOTTOM, LEFT TO RIGHT) a) long b-e), medium</td>
<td>a-e) small head</td>
<td>a-e) absent to small</td>
<td>a-e) present</td>
<td>NA b-d) concave</td>
<td>NA</td>
<td>a) NA b-c) at or above the dewclaws d-e)</td>
<td>a) flat b-e) round</td>
<td>a) cow b-e)</td>
<td>NA</td>
<td>A cow (a) lying with her calf, and two pairs of bulls fighting</td>
<td>NA</td>
<td>Traces of red on all the cattle (Kanawati 1993, 60).</td>
</tr>
<tr>
<td>Wahi</td>
<td>NA</td>
<td>(Kanawati 1995, pl. 20)</td>
<td>second Register</td>
<td>NA</td>
<td>a-f) average = 1.13</td>
<td>(left to right) a-i) medium</td>
<td>a-f) lyre 1-2</td>
<td>a-f) horizontal</td>
<td>a-f) NA g-i) present</td>
<td>a-f) NA g-i) straight</td>
<td>a-f) NA g-i) round end</td>
<td>a-f) NA g-i) bull</td>
<td>a-f) walking g-i) fighting</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wahi</td>
<td>NA</td>
<td>(Kanawati 1995, pl. 20)</td>
<td>first Register</td>
<td>NA</td>
<td>medium</td>
<td>lyre 1</td>
<td>diagonal</td>
<td>NA</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>following of man holding a calf</td>
</tr>
<tr>
<td>Mery-aa</td>
<td>D18</td>
<td>(Kanawati 1995, pl. 37)</td>
<td>8th Dynasty</td>
<td>Chapel-south wall</td>
<td>1.25</td>
<td>(LEFT TO RIGHT) 5th, 8th-14th</td>
<td>all-medium</td>
<td>(left to right) 5th lyre 1 (8th)</td>
<td>lyre 2 (9th)</td>
<td>lyre 1 (10th)</td>
<td>lyre 2 (11-13)</td>
<td>lyre 1-14</td>
<td>all diagonal</td>
<td>all heads in proportion to the body</td>
<td>all) absent to small</td>
<td>5-13) NA 14 at or above dewclaws 5-13) NA 14 straight</td>
<td>k3w′/oxen</td>
<td>A vertical line of hieroglyphs in front of the tomb owner: m33 jrw...-'Viewing the oxen... (Kanawati 1993, 60).</td>
</tr>
<tr>
<td>Mery-aa</td>
<td>D18</td>
<td>(Kanawati 1995, pl. 37)</td>
<td>first Register</td>
<td>(left bull) NA medium</td>
<td>diagonal</td>
<td>head in proportion to body</td>
<td>absent to small</td>
<td>NA</td>
<td>straight</td>
<td>at or above dewclaws</td>
<td>NA bull</td>
<td>k3w′/good beautiful bulls' (Kanawati 1995, 36)</td>
<td>A cow (a) lying with her calf, and two pairs of bulls fighting</td>
<td>white with red spots (Kanawati 1995, 42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>
Appendix N- Representations of cattle from Naga ed-Dêr

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap - thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence-cattle types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tjener ery</td>
<td>N 248</td>
<td>(Peck 1959, pl. 6)</td>
<td>Exception west wall, south</td>
<td>1</td>
<td>medium lyre 1</td>
<td>diagonal</td>
<td>NA</td>
<td>absent to small</td>
<td>not present</td>
<td>concave at or above the dewlaps</td>
<td>NA</td>
<td>bull</td>
<td>NA</td>
<td>&quot;...a squatting man who pulls on a rope fastened to the lower jaw of a long-horned bull. This is done to force the animal to kneel so that food may easily be put into his mouth.&quot; (Peck 1959, 77).</td>
<td>NA</td>
</tr>
</tbody>
</table>
## Appendix O- Representations of cattle from el-Qasr wa ‘I-Saiyed

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic Hum</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence- cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idu: Seneni</td>
<td>T 66</td>
<td>(Säve-Söderbergh 1994, pl. 9)</td>
<td>6th Dynasty (Säve-Söderbergh 1994, 26)</td>
<td>inspection</td>
<td>south wall of upper chamber</td>
<td>1.24</td>
<td>medium lyre 2</td>
<td>horizontal</td>
<td>NA</td>
<td>absent to small</td>
<td>present</td>
<td>straight</td>
<td>NA</td>
<td>NA</td>
<td>standing</td>
<td>according to Säve-Söderbergh, the text above the animal cannot be read with certainty but could possibly be read as smt.n nbr‘who listens to the mistress’ (Säve-Söderbergh 1994, 32)</td>
<td>Tomb owner inspecting cattle. Accompanying text “Inspecting the cattle and small cattle by the Count, the Sealer of the King of Lower Egypt, the Unique Friend, Great Nomarch, the revered one by the Great God, Idu.” (Säve-Söderbergh 1994, 32)</td>
<td>NA</td>
</tr>
<tr>
<td>Thauty</td>
<td>T 73</td>
<td>(Säve-Söderbergh 1994, pl. 31)</td>
<td>6th Dynasty (Säve-Söderbergh 1994, 26)</td>
<td>inspection</td>
<td>north wall of niche</td>
<td>NA</td>
<td>short</td>
<td>crescent 2</td>
<td>diagona l</td>
<td>NA</td>
<td>NA</td>
<td>present</td>
<td>NA</td>
<td>NA</td>
<td>walking</td>
<td>“In the second register is a walking ox called “the leader”...&quot; (Säve-Söderbergh 1994, 53)</td>
<td>Animal being thrown to the ground by three men</td>
<td>NA</td>
</tr>
<tr>
<td>Thauty</td>
<td>T 73</td>
<td>(Säve-Söderbergh 1994, pl. 31)</td>
<td>6th Dynasty (Säve-Söderbergh 1994, 26)</td>
<td>inspection</td>
<td>north wall of niche</td>
<td>1.7</td>
<td>long</td>
<td>lyre 1</td>
<td>diago na small</td>
<td>head</td>
<td>absent to small</td>
<td>not present</td>
<td>straight</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>penis visible-the remaining back portion of the animal does not survive-not clear if ox or bull</td>
<td></td>
</tr>
<tr>
<td>Thauty</td>
<td>T 73</td>
<td>(Säve-Söderbergh 1994, pl. 31)</td>
<td>6th Dynasty (Säve-Söderbergh 1994, 26)</td>
<td>inspection</td>
<td>north wall of niche</td>
<td>1.4</td>
<td>long</td>
<td>lyre 1</td>
<td>diago na small</td>
<td>head</td>
<td>moderate</td>
<td>present</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tomb owner inspecting cattle. Accompanying text: "Inspecting the cattle and small cattle by the Count, the Sealer of the King of Lower Egypt, the Unique Friend, Great Nomarch, the revered one by the Great God, Idu." (Säve-Söderbergh 1994, 32)
## Appendix P- Representations of cattle from Qift

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence - cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM3J</td>
<td>NA</td>
<td>QM No. 182 (Mostafa 2014, back cover)</td>
<td>8th Dynasty offering</td>
<td>NA</td>
<td>NA</td>
<td>hornless round head</td>
<td>NA</td>
<td>small head</td>
<td>absent to small present</td>
<td>straight</td>
<td>NA</td>
<td>cow</td>
<td>NA</td>
<td>walking</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix Q - Representations of cattle from el-Khokha (Thebes)

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Date</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Textual Evidence - cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ihy</td>
<td>TT186</td>
<td>(Saleh 1977, pl. 16) third register inspection</td>
<td>Wall I</td>
<td>(Left to right) a) medium hornless bases round</td>
<td>a) .95 b) NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Appendix R - Representations of cattle from Qubbet el-Hawa

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Tomb Number</th>
<th>Image Reference</th>
<th>Type of Scene (offering, inspection, receiving of tribute, exception)</th>
<th>Location in Tomb</th>
<th>Date</th>
<th>X</th>
<th>Horn size</th>
<th>Horn Shape</th>
<th>Horn Protrusion Angle</th>
<th>General Skull Morphology</th>
<th>Dewlap Size</th>
<th>Cervico-thoracic hump</th>
<th>Back Shape</th>
<th>Tail Length</th>
<th>Switch Shape</th>
<th>Sex</th>
<th>Textual Evidence - cattle types</th>
<th>Activity of cattle</th>
<th>Notes</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhru and Sabni</td>
<td>A1</td>
<td>(De Morgan 1894, 148, second register)</td>
<td>6th Dynasty (OEE database)</td>
<td>exception</td>
<td>NA</td>
<td>a-b) 86</td>
<td>b) 1.5</td>
<td>(Left to right) a) short b-e) medium c) long d) lyre e) lyre</td>
<td>(1) horizontal 2 al</td>
<td>a) diagona l b) absent to small</td>
<td>a-b) not present</td>
<td>a-b) straight</td>
<td>a) at or above hocks b) at or above dewclaws</td>
<td>a-b) NA</td>
<td>a-b) NA</td>
<td>exception</td>
<td>lynx 1 bull</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hiq-Ab</td>
<td>A2</td>
<td>(De Morgan 1894, 151, first register)</td>
<td>inspection</td>
<td>north wall</td>
<td>NA</td>
<td>NA</td>
<td>(Left to right, top to bottom) a) short b) to small</td>
<td>hornless flat head</td>
<td>NA</td>
<td>small head, dished face</td>
<td>absent to small</td>
<td>present straight</td>
<td>a) below dewclaws b) at or above hocks f)</td>
<td>a-e) NA</td>
<td>f) bull from context</td>
<td>a-e) NA</td>
<td>walking</td>
<td>NA</td>
<td>white</td>
<td></td>
</tr>
<tr>
<td>Khunes</td>
<td>A6</td>
<td>(De Morgan 1894, 160, seventh register)</td>
<td>inspection</td>
<td>south wall</td>
<td>a-f) NA (too small)</td>
<td>a-e) NA</td>
<td>a-d) medium b-e) long f)</td>
<td>a-f) little l 1 f) crescent</td>
<td>a-f) diagona l</td>
<td>a-f) not present</td>
<td>a-b) present straight</td>
<td>a) concave e) straight f) NA</td>
<td>a-e) NA</td>
<td>a-b) at or above hocks c) g)</td>
<td>a-g) NA</td>
<td>NA</td>
<td>walking</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khunes</td>
<td>A6</td>
<td>(De Morgan 1894, 160, sixth register)</td>
<td>inspection</td>
<td>south wall</td>
<td>a-g) NA (too small)</td>
<td>a-g) NA</td>
<td>(Left to right) a) short b) to small c) medium d) round e) b-g)</td>
<td>b-g) lyre 1</td>
<td>a-f) diagona l</td>
<td>a-g) not present</td>
<td>a-b) present straight</td>
<td>a) concave b) straight c-g) NA</td>
<td>a-e) NA</td>
<td>a-b) at or above hocks c-g)</td>
<td>a-g) NA</td>
<td>NA</td>
<td>walking</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khunes</td>
<td>A6</td>
<td>(De Morgan 1894, 160, fifth register)</td>
<td>inspection</td>
<td>south wall</td>
<td>a-f) NA (too small)</td>
<td>a-g) NA</td>
<td>(Left to right, front to back) a) short b) to small c-d) medium d) crescent e) d-e)</td>
<td>e-f) crescent</td>
<td>a-f) diagona l</td>
<td>a-g) not present</td>
<td>a-b) present straight</td>
<td>a) concave b-d) NA e-f) not present</td>
<td>a-d) NA</td>
<td>a-d) NA from context</td>
<td>a-d) NA</td>
<td>a-d) walking</td>
<td>e-f) fighting</td>
<td>no genitalia are present</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Khunes</td>
<td>A6</td>
<td>(De Morgan 1894, 160, fourth register)</td>
<td>inspection</td>
<td>south wall</td>
<td>a-d) NA (too small)</td>
<td>a-d) NA</td>
<td>(Left to right, front to back) a) short b) to small c) medium d) crescent e) d-e)</td>
<td>e-f) crescent</td>
<td>a-f) diagona l</td>
<td>a-d) not present</td>
<td>a-d) not present</td>
<td>a) straight b) NA c) straight d) NA</td>
<td>a-d) NA</td>
<td>a-d) NA from context</td>
<td>a-d) NA</td>
<td>a-d) pulling plow c-d</td>
<td>walking</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Khunes</td>
<td>A6</td>
<td>(De Morgan 1894, 160, third register)</td>
<td>inspection</td>
<td>south wall</td>
<td>a-d) NA (too small)</td>
<td>a-d) NA</td>
<td>(Left to right, front to back) a) short b) to small c) medium d) crescent e) d-e)</td>
<td>e-f) crescent</td>
<td>a-f) diagona l</td>
<td>a-d) not present</td>
<td>a-d) not present</td>
<td>a) straight b) NA c) straight d) NA</td>
<td>a-d) NA</td>
<td>a-d) NA from context</td>
<td>a-d) NA</td>
<td>a-d) pulling plow c-d</td>
<td>walking</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
Appendix S- Map of Egypt with the sites that are included in the database

1. Merimde
2. Giza
3. Abusir
4. Saqqara
5. Gerza
6. Meidum
7. Deshasha
8. Tehna
9. Zawyet el-Maiyetin
10. Meir
11. Deir el-Gebrawi
12. Matmar
13. Badari
14. Hemamiya
15. Sohag
16. Hagarsa
17. Naga ed- Dêr
18. Mahasna
19. Abydos
20. El-Amrah
21. Hu
22. El-Qasr wa' l-saiyed
23. Gift
24. Naqada
25. El-Khoka
26. Asfun
27. Hierakonpolis
28. Abu Zaiden
29. Qubbet el-Hawa


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Plates
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Gerza; The Petrie Museum of Egyptian Archaeology, UCL  
UC10736  
(http://petriecat.museums.ucl.ac.uk/detail.aspx)

Gerza (Petrie et al. 1912, pl. 5, 205)

Provenance Unknown; The British Museum,  
London  
EA32134  
Photograph © Trustees of the British Museum,  
(www.britishmuseum.org)
a. Provenance Unknown (Petrie 1914, pl. 5, 62d)

b. Matmar (Brunton 1948, pl. 22, 30)

c. Provenance Unknown; The National Museums of World Culture-The Museum of Mediterranean and Near Eastern Antiquities, Stockholm MM 10542
http://collections.smvk.se/carlotta-mhm/web/object/3007078

d. Naqada; Das Ägyptische Museum, Berlin ÄM13805 (Priese 1991, 5)
(German Archaeological Institute, Cairo)

e. El-Amrah; The British Museum, London EA35506
(Randall-Maclver and Mace 1902, pl. 9, fig.1)
Courtesy of Egyptian Exploration Society
Provenance Unknown; The British Museum, London
EA32124
Photograph © Trustees of the British Museum,
(www.britishmuseum.org)

Hemamiya
(Brunton 1927, pl. 17)

Abydos?; Royal Museums for Art and History, Brussels
E3381a
(Hendrickx 2002, 281 fig. 16.1a)

Provenance Unknown; Museum of Archaeology and Anthropology, Cambridge Z39527
Photo courtesy of Géraldine Ashby
El-Amrah (Randall-Maclver and Mace 1902, pl. 9, fig.2)
 Courtesy of Egyptian Exploration Society
a. Hierakonpolis; The Ashmolean Museum of Art and Archaeology, Oxford E3631(Capart 1905, 249 fig. 187)

b. Provenance Unknown; Metropolitan Museum of Art, New York City 30.8.224 (http://www.metmuseum.org/art/collection/search/544067)

c. Abydos (Petrie 1901, pl. 11, 1) Courtesy of Egyptian Exploration Society

d. Hierakonpolis (Quibell and Petrie 1900, pl. 12, 1) Courtesy of Egyptian Exploration Society

e. Provenance Unknown; The British Museum, London EA66953 The British Museum, Photograph © Trustees of the British Museum, (www.britishmuseum.org)
Abydos
(Leclant and Clerc 1992, pl. 28 fig. 35)

Abydos;
The Museum of Egyptian Antiquities, Cairo
(Leclant and Clerc 1992, pl. 28 fig. 35)

Abydos (Petrie 1901, pl. 7, 8)
Courtesy of Egyptian Exploration Society

Abydos (Petrie 1900, pl. 20, 15)
Courtesy of Egyptian Exploration Society

Abydos (Petrie 1900, pl. 27, 73)
Courtesy of Egyptian Exploration Society
Abu Zaidan; Brooklyn Museum, Brooklyn
09.889.118 (Churcher 1984, 154)

Sohag; British Museum, London
EA68512
(Bénédite 1918b, 227 fig. 1)
a. Mahasna; The British Museum, London
EA49025
(Aryton and Loat 1911, pl. 14, 1)
Courtesy of Egyptian Exploration Society

b. Provenance Unknown;
The Petrie Museum of Egyptian Archaeology, UCL
UC15335
(Petrie 1920, pl. 18, 70)

c. Abydos
(Dreyer 1998a, 67 abb. 46, j2/1)
(German Archaeological Institute, Cairo)

d. Abydos
(Dreyer 1998a, 67 abb. 46, j11/2)
(German Archaeological Institute, Cairo)

e. Abydos
(Dreyer 1998a, 68 abb. 48, jS/2)
(German Archaeological Institute, Cairo)
a. Hu (Petrie and Mace 1901, pl. 20, 28)
   Courtesy of Egyptian Exploration Society

b. Matmar (Brunton 1948, pl. 22, 2)

c. Naqada/Ballas
   (Petrie and Quibell 1896, pl. 51, 15a)

d. Hierakonpolis; The Museum of Egyptian Antiquities, Cairo
   CG14716 or JE32169
Provenance Unknown; Louvre, Paris
E11255
© Musée du Louvre/C. Décamps

Provenance Unknown; Hierakonpolis
(Capat 1905, 249 fig. 187)

Provenance Unknown; Metropolitan Museum of Art, New York City 26.7.1281
(Bénédite 1918a, pl. 2)

Hierakonpolis (Quibell and Petrie 1900, pl. 17)
Abydos; Abydos Storeroom
(Dreyer 1993, pl. 6f)
(German Archaeological Institute, Cairo)

Abydos; University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia
E9396
(Petrie 1901, pl. 10, 2)
Courtesy of Egyptian Exploration Society

Saqqara; The Museum of Egyptian Antiquities, Cairo
JE70114
(Emery 1938, pl. 17a)
Hierakonpolis; The Ashmolean Museum of Art and Archaeology, Oxford
E3631
(Capart 1905, 249 fig. 187)

Sohag; Phoebe A. Hearst Museum of Anthropology, University of California
Courtesy of the Phoebe A. Hearst Museum of Anthropology and the Regents of the University of California (Catalog No. 6-17633)

Asfun (Weigall 1907, 49 fig. 5)
a. Naqada/Ballas
(Petrie and Quibell 1896, pl. 51, 14)

b. Saqqara; The Museum of Egyptian Antiquities, Cairo
JE70149
Author’s photograph

c. Abydos (Petrie 1901, pl. 5, 1)
Courtesy of Egyptian Exploration Society

d. Hierakonpolis (Adams 2000, pl. 48a)
Mereruka, Saqqara (The Sakkarah Expedition 1938b, pls. 168-169)
Courtesy of the Oriental Institute of the University of Chicago
a. Iteti: Shedu, Deshasha (Kanawati and McFarlane 1993, pl. 51)

b. Khunes (A6), Qubbet el-Hawa (De Morgan 1894, 160)

c. Ibi (8), Deir el-Gebrawi (Davies 1902, pl. 7)
   Courtesy of Egyptian Exploration Society

d. Nebet, Saqqara (Munro 1993, pl. 17)
   (German Archaeological Institute, Cairo)

e. Ptahhotep (31), Saqqara (Lepsius 1849-1859, pl. 104a)

f. Kaimheshet, Saqqara (McFarlane 2004, pl. 48)
Akhmerutnesut, Giza (Smith 1949, fig. 226c)

Khunes (A6), Qubbet el-Hawa (De Morgan 1894, 160)

Ptahhotep II (D64), Saqqara (Quibell et al. 1989, pl. 31)

Funerary Temple of Sahure, Abusir (Borchardt 1913b, pl. 1)
a. Senedjemib: Mehi (G2378), Giza (Brovarski 2001, fig. 119)
Photograph © Museum of Fine Arts, Boston

b. Kagemni (LS 10), Saqqara
(Harpur and Scremin 2006, 116 fig. 181)
© Oxford Expedition to Egypt

c. Nikaiankh I (13), Tehna (Thompson 2014, pl. 55)

d. Inti, Deshasha (Kanawati and McFarlane 1993, pl. 33)
Ibi (8), Deir el-Gebrawi (Davies 1902, pl. 11)
Courtesy of Egyptian Exploration Society

Thauty (T 73), el- Qasr wa’ l-Saiyad
(Säve-Söderbergh 1994, pl. 31)

Mery (C2), Hagarsa (Kanawati 1993, pl. 43)

Wahi, Hagarsa (Kanawati 1995, pl. 20)

Mery-aa (D18), Hagarsa
(Kanawati 1995, pl. 37)

Khunes (A6), Qubbet el-Hawa
(De Morgan 1894, 160)

Iteti: Shedu, Deshasha
(Kanawati and McFarlane 1993, pl. 51)
Niankhkhnum and Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, pl. 82)
(German Archaeological Institute, Cairo)

Nikauisesi, Saqqara
(Kanawati and Abder-Raziq 2000, pl. 51a)

Inumin, Saqqara (Kanawati 2006, pl. 49a (fourth, third, second, first))
Nefer and Kahay, Saqqara (Moussa and Altenmüller 1971, pl. 6) (German Archaeological Institute, Cairo)

Ihy, Saqqara (Kanawati and Abder-Raziq 2003, pl. 71)

Ptahhotep (31) (Lepsius 1849-1859, pl. 102b)

Kaemnefert, Saqqara (Simpson 1992, pl. E) Photograph © Museum of Fine Arts, Boston
Akhethotep (D64) (Davies 1901, pl. 21)
Courtesy of Egyptian Exploration Society

Neber, Saqqara (Munro 1993, pl. 19)
(German Archaeological Institute, Cairo)

Niankhkhnum and Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, pl. 52)
(German Archaeological Institute, Cairo)

Nefer and Kahay, Saqqara
(Moussa and Altenmüller 1971, pl. 24b)
(German Archaeological Institute, Cairo)

Ti (D22), Saqqara
(Wild 1966, pl. 169)
©Institut Français d’Archéologie Orientale
a. Ti (D22), Saqqara (Wild 1966, pl. 168) ©Institut Français d'Archéologie Orientale

b. Nebet, Saqqara (Munro 1993, pl. 19) (German Archaeological Institute, Cairo)

c. Niuty (G4611), Giza (Lepsius 1913, pl. 30)

d. Akhethetep (Louvre), Saqqara (Ziegler 2007, fig. 39)
Ptahhotep II (D64), Saqqara (Quibell et al. 1989, pl. 31)

Seankhuiptah, Saqqara (Kanawati and Abder-raziq 1998, pl. 66)

Ankhmahor, Saqqara (Kanawati and Hassan 1997, pl. 43 b,c)

Werkhww (LG 95), Giza (Hassan 1944, fig. 106)
Hemetre, Giza (Hassan 1950, 49 fig. 38)

Sehetepu, Giza (Junker 1953, 64 abb. 36)

Iasen (G2196), Giza (Simpson 1980, fig 31)

Photograph © Museum of Fine Arts, Boston

Kaemnefert II, Giza (Hassan 1936, fig. 136)

Seshathetep (G 5150), Giza (Kanawati 2002, pl. 45)

Rawer II (G5470), Giza (Junker 1938, 233 fig. 48)
Debehen (G 8090), Giza (Hassan 1943, fig. 122)

Khafreankh (G7948), Giza (Lepsius 1849-1859, pl. 9)

Nesutnefer(G4970), Giza (Kanawati 2002, pl. 53)

Hemetre, Giza (Hassan 1950, 49 fig. 37)
a. Nikauisesi, Saqqara
(Kanawati and Abder-Raziq 2000, pl. 51b)

b. Hiq-ib (A2), Qubbet el-Hawa
(De Morgan 1894, 151)

c. Pepyankh the Black (A2), Meir
(Kanawati 2014, pl. 92)

d. Pepyankh the Middle (D2), Meir
(Blackman 1924, pl. 16)
Courtesy of Egyptian Exploration Society
a. Rahotep (Mastaba 6), Meidum (Petrie 1892, pl. 9)

b. Sekhemankhtah (G7152), Giza (Badaway 1976, fig. 20)

c. Qar, Abusir (Bárta et al. 2009, 91 fig. 5.3.3)
Qar, Abusir (Bárta et al. 2009, 90 fig. 5.3.2)

a.  

b. Iteti: Shedu, Deshasha (Kanawati and McFarlane 1993, pl. 51)

c. Niankhpepy the Black (A1), Meir (Kanawati et al. 2015, pl. 67)

d. Djau/Shemai and Djau (S12), Deir el-Gebrawi (Kanawati 2013, pl. 67)
a. Ibi(8) Deir- el Gebrawi (Davies 1902, pl. 7)
Courtesy of Egyptian Exploration Society

b. Ibi(8) Deir- el Gebrawi (Davies 1902, pl. 11)
Courtesy of Egyptian Exploration Society

c. Shemai, Qift (Mostafa 2014, back cover)

d. Ibi(8) Deir- el Gebrawi (Davies 1902, pl. 11)
Courtesy of Egyptian Exploration Society

e. Pepyankh the Middle (D2), Meir
(Blackman 1924, pl. 16)
Courtesy of Egyptian Exploration Society

f. Mery C2, Hagarsa (Kanawati 1993, pl. 43)
a. Kaiemankh (G4561), Giza (Kanawati 2001, pl. 31)

b. Kaiemankh (G4561), Giza (Kanawati 2001, pl. 36)

c. Tjetu (G 2001), Giza (Simpson 1980, fig 22)

Photograph © Museum of Fine Arts, Boston

d. Iasen (G2196), Giza (Simpson 1980, fig 30)

Photograph © Museum of Fine Arts, Boston

e. Itisen, Giza (Hassan 1944, fig. 123)

f. Senedjemib: Inti (G 2370), Giza (Brovarski 2001, fig. 42)

Photograph © Museum of Fine Arts, Boston
Iymery (G6020), Giza (Weeks 1994, fig. 34)
Photograph © Museum of Fine Arts, Boston

Akhethotep (D64), Saqqara (Davies 1901, pl. 14)
Courtesy of Egyptian Exploration Society

Hetepherakhti (D60), Saqqara (Mohr 1943, fig. 32)
Hetepherakhti (D60), Saqqara (Mohr 1943, fig. 4)
Ihy (TT186), Thebes (Saleh 1977, pl. 18)  
(German Archaeological Institute, Cairo)

Mekhu and Sabni (A1), Qubbet el-Hawa  
(De Morgan 1894, 148)

Pepyankh the Middle (D2), Meir  
(Blackman 1924, pl. 16)  
Courtesy of Egyptian Exploration Society

Inti, Deshasha (Kanawati and McFarlane 1993, pl. 30)
a. Tjemery (N 248), Naga ed-Der (Peck 1959, pl. 6)

b. Mekhu and Sabni (A1), Qubbet el-Hawa (De Morgan 1894, 148)

c. Thauty (T73), el-Qasr wa 'l-Saiyad (Säve-Söderbergh 1994, pl. 31)

d. Iteti: Shedu, Deshasha (Kanawati and McFarlane 1993, pl. 51)

e. Nikaiankh I (13), Tehna (Thompson 2014, pl. 54)

f. Temple of Sahure, Abusir (Borchardt 1913b, pl. 47)
a. Atet (Mastaba 16), Meidum (Petrie 1892, pl. 24)

b. Atet (Mastaba 16), Meidum (Petrie 1892, pl. 27)

c. Djau (S 12), Deir el- Gebrawi (Kanawati 2013, pl. 64)

d. Djau (S 12), Deir el- Gebrawi (Kanawati 2013, pl. 74)
Pepyankh the Black (A2), Meir (Kanawati 2014, pl. 82)

Ni-Ankh-Pepi (A1), Meir
(Blackman 1953, pl. 11)
Courtesy of Egyptian Exploration Society

Pepyankh the Black (A2), Meir
(Kanawati 2014, pl. 92)
a. Pepyankh the Middle (D2), Meir (Blackman 1924, pl. 16)
   Courtesy of Egyptian Exploration Society

b. Ni-Ankh-Pepy the Black (A1), Meir (Kanawati et al. 2015, pl. 64)
a. Kaemnefert II, Giza (Hassan 1936, fig. 136)

b. Nefer-Khuwi (G2098), Giza (Roth 1995, fig. 194)
   Photograph © Museum of Fine Arts, Boston

c. Khnumenti (G2374), Giza (Brovarski 2001, fig 88)
   Photograph © Museum of Fine Arts, Boston

d. Meresankh III (G7530), Giza (Dunham and Simpson 1974, fig. 4)
   Photograph © Museum of Fine Arts, Boston

e. Iymery (G6020), Giza (Weeks 1994, fig. 31)
   Photograph © Museum of Fine Arts, Boston

f. Neferbauptah (G 6010), Giza (Weeks 1994, fig. 24)
   Photograph © Museum of Fine Arts, Boston
Kaemnefert (63), Giza (Badawy 1976, fig. 29)

Akhet-hetep (G8942), Giza (Hassan 1932, 79 fig. 137)

Kaemnefert (63), Giza (Badawy 1976, fig. 30c)

Kapi (G2091), Giza (Roth 1995, fig. 168)
Photograph © Museum of Fine Arts, Boston

Iymery (G6020), Giza (Weeks 1994, fig. 42) Photograph © Museum of Fine Arts, Boston
a. Seshemnefer IV (53), Giza (Lepsius 1849-1859, pl. 80e)

b. Sehetepu, Giza (Junker 1953, 59 abb. 35)

c. Iymery (G6020), Giza (Weeks 1994, fig. 31)

d. Niuty (G4611), Giza (Lepsius 1913, pl. 30)

e. Kadebehen, Giza (Hassan 1944, fig. 69)

f. Kaemnefert (63), Giza (Badawy 1976, fig. 29)
a. Kapi (G2091), Giza (Roth 1995, fig. 155)
   Photograph © Museum of Fine Arts, Boston

b. Neferbauptah (G6010), Giza (Weeks 1994, fig. 18)
   Photograph © Museum of Fine Arts, Boston

c. Seshathetep/Heti (G5150), Giza (Kanawati 2002, pl. 44)

d. Seshemnefer IV (53), Giza (Junker 1953, 209 abb. 80)

e. Rawer II (G5470), Giza (Junker 1938, 233 fig. 48)
a. Khnumenti (G2374), Giza (Brovarski 2001, fig. 88)  
Photograph © Museum of Fine Arts, Boston

b. Hemu: Shepseskaefan (G8494), Giza  
(Hassan 1950, 89 fig. 70)

c. Redi (G2086), Giza  
(Roth 1995, fig. 143) Photograph ©  
Museum of Fine Arts, Boston

d. Sekhemka, Giza (Simpson 1980, fig. 4)  
Photograph © Museum of Fine Arts, Boston

xli
Kaemnefert II, Giza (Hassan 1936, fig. 147)

Kaemnefert (63), Giza (Badawy 1976, fig. 30c)

Kapi (G2091), Giza (Roth 1995, fig. 156) (a-c)
Photograph © Museum of Fine Arts, Boston

Kapi (G2091), Giza (Roth 1995, fig. 167)
Photograph © Museum of Fine Arts, Boston
Seshemnefer II (G5080), Giza (Kanawati 2002, pl. 62)

Merib (G 2100), Giza (Lepsius 1849-1859, pl. 19)

Meresankh III (G7530), Giza (Dunham and Simpson 1974, fig. 4)

Iymery (G6020), Giza (Weeks 1994, fig. 27)

Hemu: Shepseskaefankh (G8492), Giza (Hassan 1950, 84 fig. 66)

Niankhkhnum, Giza (Hassan 1950, 139 fig. 131)
Hemu: Shepseskaefankh (G8493), Giza
(Hassan 1950, 85 fig. 67)

Iymery (G6020), Giza (Weeks 1994, fig. 29)
Photograph © Museum of Fine Arts, Boston

Kapi (G2091), Giza (Roth 1995, fig. 156) Photograph © Museum of Fine Arts, Boston

Nikauhathor, Giza
(Hassan 1950,175 fig. 167)
Iasen (G2196), Giza (Simpson 1980, fig. 31) Photograph © Museum of Fine Arts, Boston

Nefermaat (G7060), Giza (Lepsius 1849-1859, pl. 17b)

Herunefer (G2353), Giza (Simpson 1980, fig. 49) Photograph © Museum of Fine Arts, Boston

Ti (D22), Saqqara (Wild 1966, pl. 168) ©Institut Français d'Archéologie Orientale

pl. xlv
Niankhkhnum: Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, pl. 84)
(German Archaeological Institute, Cairo)

Seshemnefer: Ifi, Saqqara
(Barsanti 1900, fig. 9)

Nebet, Saqqara (Munro 1993, pl. 17)
(German Archaeological Institute, Cairo)

Mehu, Saqqara (Altenmüller 1998, pl. 44a)
a. Ihy, Saqqara (Kanawati and Abder-Raziq 2003, pl. 66)

b. Niankhkhnum and Khnumhotep, Saqqara (Moussa and Altenmüller 1977, pl. 53) (German Archaeological Institute, Cairo)

c. Hesi, Saqqara (Kanawati and Abder-Raziq 1999, pl. 65)

d. Akhethotep (D64), Saqqara (Davies 1901, pl. 21) Courtesy of Egyptian Exploration Society
Ankhmahor, Saqqara
(Kanawati and Hassan 1997, pl. 43 b,c)

Meryteti, Saqqara (Kanawati and Abder-raziq 2004, pl. 48)

Perneb (S913), Saqqara (Williams 1932, pl. 6)

Ti (D22), Saqqara (Wild 1966, pl. 169)
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Ti (D22), Saqqara (Wild 1966, pl. 167)
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Kaiemheset, Saqqara (McFarlane 2004, pl. 48)

Hetepherakhti (D60), Saqqara (Mohr 1943, fig. 35)
Nefer and Kahay, Saqqara
(Moussa and Altenmüller 1971, pl. 24b)
(German Archaeological Institute, Cairo)

Neferirtenef (D55), Saqqara
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Iy nefert, Saqqara
(Kanawati and Abder-raziq 2003, pl. 44 a,b)
Ptahhotep II (D64), Saqqara
(Quibell et al. 1989, pl. 31)

Niankhkhnum and Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, pl. 53)
(German Archaeological Institute, Cairo)

Hesi, Saqqara
(Kanawati and Abder-Raziq 1999, pl. 62)

Kaemnafert (D23), Saqqara (Simpson 1992, pl. E)
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Niankhkhnum and Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, abb. 17) (German Archaeological Institute, Cairo)

Niankhkhnum and Khnumhotep, Saqqara
(Moussa and Altenmüller 1977, pl. 52) (German Archaeological Institute, Cairo)

Rashepses (LD 16), Saqqara
(Lepsius 1849-1859, pl. 61b)

Nebet, Saqqara (Munro 1993, pl. 19)
(German Archaeological Institute, Cairo)
a. Manefer (LS 17), Saqqara (Lepsius 1849-1859, pl. 69)
b. Manefer (LS 17), Saqqara (Lepsius 1849-1859, pl. 70)

c. Rashepses (LD16), Saqqara (Lepsius 1913, pl. 41)
d. Ptahhotep (31), Saqqara (Lepsius 1849-1859, pl. 102a)
a. Ptahhotep (31), Saqqara (Lepsius 1849-1859, pl. 104a)

b. Ptahhotep (31), Saqqara (Lepsius 1849-1859, pl. 102a)

c. Seshemnefer: Ifi, Saqqara (Barsanti 1900, fig. 9)

d. Hetepherakhti (D60), Saqqara (Mohr 1943, fig. 4)

e. Thenti (G4920), Giza (Lepsius 1849-1859,31a)

f. Mery-aa (D18), el-Hagarsa (Kanawati 1995, pl. 37)
Ibi (8), Deir el-Gebrawi
(Davies 1902, pl. 11)
Courtesy of Egyptian Exploration Society

Ibi (8), Deir el-Gebrawi
(Davies 1902, pl. 7)
Courtesy of Egyptian Exploration Society

Iteti: Shedu, Deshasha
(Kanawati and McFarlane 1993, pl. 51)
a. Pepyankh the Black (A2), Meir (Kanawati 2014, pl. 92)

b. Pepyankh the Black (A2), Meir (Kanawati 2014, pl. 82)

c. Khunes (A6), Qubbet el-Hawa (De Morgan 1894, 160)

d. Idu: Seneni (T66), el-Qasr wa ‘l-Saiyad (Säve-Söderbergh 1994, pl. 9)