

**MECHANICAL ENGINEERING IN ANCIENT EGYPT, PART XXVI:
MODELS INDUSTRY (CATTLES, BUTCHERS, OFFERING BEARERS
AND HOUSES)**

Prof. Dr. Galal Ali Hassaan*

Emeritus Professor, Department of Mechanical Design & Production, Faculty of Engineering,
Cairo University, Egypt.

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***Corresponding Author**

**Prof. Dr. Galal Ali
Hassaan**

Emeritus Professor,
Department of Mechanical
Design & Production,
Faculty of Engineering,
Cairo University, Egypt.

ABSTRACT

This is the 26th research paper exploring the evolution of Mechanical Engineering in Ancient Egypt. The paper investigates the production of models for cattle, butchers, offering bearers and houses in ancient Egypt. The design of the models, the used raw material, its homeland, date and location now are investigated. The coloring of the models is highlighted to clarify the beauty aspects associated with some models.

The analysis outlined also the degree of complexity in the design of the different models.

KEYWORDS: History of mechanical engineering, ancient Egypt, cattle models, butcher models, offering bearers models, house models.

INTRODUCTION

This is the 26th research paper in a series aiming at exploring the evolution of mechanical engineering in ancient Egypt through the different activities of their wonderful civilization. In the previous part of this series, I discussed the model industry in ancient Egypt focusing on some activities of the daily life of the ancient Egyptians. This paper extends the work in some more activities of their daily life.

Wassell, 1991 in his Ph. D. Thesis presented a classification of the animal kingdom in ancient Egypt including bats, cattle, dogs, elephant, goats, horse (and donkey), lions, monkeys, pigs, sheep, birds, fish, reptiles and insects. He didn't submit any graphical illustrations in his

thesis.^[1] Tooley, 1995 in her book about Egyptian models and scenes presented models for female bearer from the 6th Dynasty, bearers from the 11th Dynasty, bearers from the 11th / 12th Dynasties, bearers from the 12th Dynasty, butchers from the 11th Dynasty and cattles from the 12th Dynasty.^[2] Wikimedia, 2007 studied a funerary model of a cattle stable from the 11th Dynasty. The model consisted of two compartments with door in between and comprising six cattles and two servicing staff. The model is in display in the Metropolitan Museum of Art at NY.^[3] Brooker, 2009 in his Master of Philosophy Thesis presented ancient Egyptian models for a house from Rifeh, house model from Louvre, house models from Tomb of Meketre of the 12th Dynasty.^[4]

Maria, 2012 in her Ph. D. Thesis presented some house models from the 12th and 13th Dynasties including model from the Tomb of Meketre of the 12th Dynasty.^[5] Freeman, 2012 wrote an article about ancient Egyptians as model builders and presented some models including female bearers, offering bearers model from Bersheh Tomb, cattle model from Meketre Tomb and a weaving model from the 11th Dynasty.^[6] Reshafim, 2014 declared that ancient Egyptians built rectangular houses with sun dried bricks since 3800 BC. They presented a garden model with fig trees and a basin from 2000 BC. They outlined also a house for a Nobleman with garden inside and surrounding it.^[7] Buzard, 2014 wrote an article about the Tomb of Meketre, a chancellor and high steward during the reign of King Mentuhotep II of the 12th Dynasty. He presented models for offering bearers and weavers.^[8] Wikipedia, 2015 wrote an article about gardens of ancient Egypt pointing out the types of gardens established by ancient Egyptians and announced that some garden models were placed in Tombs. They presented a funerary model of a garden model dated to the 11th Dynasty from Thebes.^[9] Wikipedia, 2016 presented a model for cattle from Naqada I (3500 BC) displayed in the British Museum of London. The model was produced from clay, fired at low temperature and painted.^[10] Hassaan, 2016 studied the models industry in ancient Egypt in terms of models for boats, ploughing, grain grinding, bakery and brewery. He analysed available models showing the mechanical engineering technology embedded in the presented models.^[11]

Cattles Models

Cattles ranching represented an important activity in the ancient Egyptian society since Egypt was an agricultural state from the old times because of the River Nile going through it. They

illustrated this activity through models of various designs and were keen to keep them into their Tombs of Nobles as will be highlighted below.

- Fig.1 shows a model of cattle from El-Amra of ancient Egypt during the period of Naqada I in display in the British Museum at London.^[10] The model is produced from clay, heated and then painted. It comprises four bulls of long curved horns and the body is painted in black and brown.



Fig 1: Cattle model from Naqada I.^[10]

- Fig.2 shows a model for cattle stable from the 11th Dynasty and in display in the Metropolitan Museum of Art at NY.^[3] The stable consists of two compartments with door in between and served by a team of workers. There are at least three types of cattle based on their colors. Pure brown type, pure black type and mixed white and black type. There is no roof for the stable, it has one external door and it has a storage silo. It is clear from the far compartment of the stable that the designer used a parallelogram chamber adjacent to the wall for the fodder exactly as what happens nowadays in Egypt after more than 5500 years.



Fig 2: Model of a cattle stable from the 11th Dynasty.^[3]

- Fig.3 shows another example of the cattle models of the 11th Dynasty. It is for a cow giving birth in display in the Royal Ontario Museum of Canada.^[12] The cow has two colors and her born is pure brown. The cow is served by two workers.

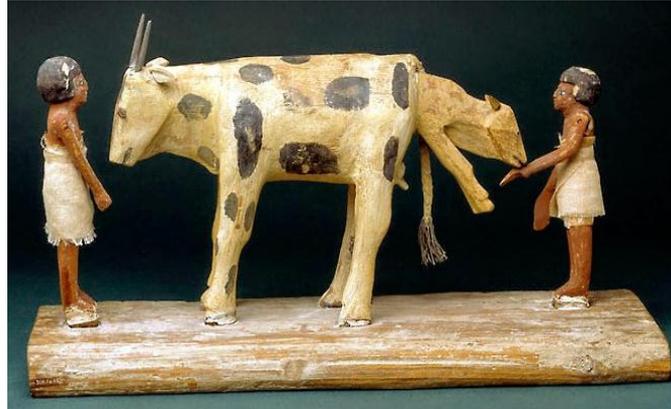


Fig 3: Model for a cow giving birth from the 11th Dynasty^[12],

- Fig.4 shows (may be) the most complex model for the Chancellor Meketre of the 12th Dynasty attending a counting process for his cattle. The model is from painted wood and in display in the Egyptian Museum at Cairo.^[13] Meketre is setting un a shrine with his staff and the cattle passes in front of him under the control of a number of workers.

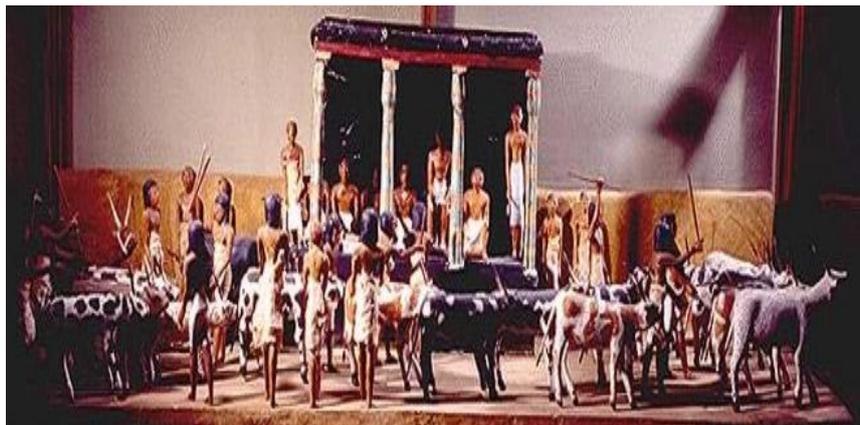


Fig 4: Model for cattle counting from the 12th Dynasty.^[13]

- Fig.5 shows an Ox from the 12th Dynasty in display in the Princeton University Art Museum at USA.^[14] The ox is nicely colored with two different colors covering the whole body and head. It has two vertical horns and two horizontal ears.

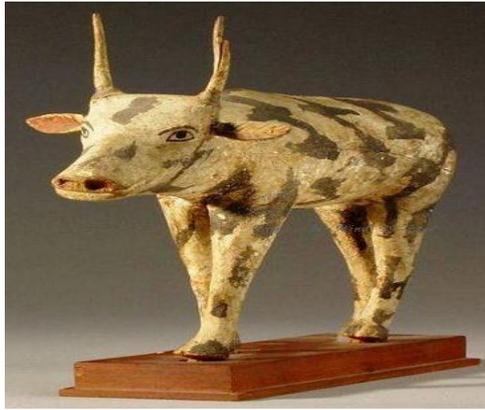


Fig 5: Ox from the 12th Dynasty.^[14]

- The last example of cattle models is from the Third Intermediate Period (1070-664 BC). It is for a bull in display in the Brooklyn Museum and shown in Fig.6.^[15] The model represents the bull in a sitting position and produced from reeds and cloth. It has one brown color.



Fig 6: Bull model from the 3rd Intermediate Period.^[15]

Butchers Models

Ancient Egyptians used cattles for performing some agricultural processes and as a source for protein through slaughtering and providing animals meat. Because of this they established slaughtering workshops and prepared qualified staff (butchers) for this purpose. They produced models for the slaughtering process and kept them in the Tombs of high rank officials.

- The first example is for a butcher model slaughtering an ox from the 5th Dynasty reign of King Nyuserre and in display in the Oriental Institute Museum of the University of Chicago and shown in Fig.7.^[16] Rekhmire wife Meryt is setting beside him and wearing a white-tight Corselet. The model is manufactured from limestone and painted. The ox is tied from his

front and back legs and the butcher is holding the knife in his right hand and ready to slaughter the ox.



Fig 7: Butcher model from the 5th Dynasty.^[16]

- The second example is for a model of a team in a butcher shop in operation from the 6th Dynasty and in display in the Oriental Institute Museum of Chicago University and shown in Fig.8.^[17] The team consists of four workers, three holding the ox or cow in position and the fourth is slaughtering it. One of the workers is pushing a cylindrical wood block against the ox while the four legs of it are tightened together. There is another cylindrical block near the head. I think this is a brand new technique used for the first time in slaughtering houses..



Fig 8: Butchers model from the 6th Dynasty.^[17]

- The third example is for a model of a slaughter house from the 11th Dynasty shown in Fig.9.^[18] The house is ready for slaughtering one ox or cow. The working team is five as clear in the zoomed section of the model shown in Fig.9. The four legs of the ox are tied together and all the workers are busy in preparing the place to start the work. The π section in the

slaughtering house may be to help the butchers to get red of the bones and to cut the meat to pieces as required by the users.



Fig 9: Slaughter house model from the 11th Dynasty^[18]

- The fourth model is for butchers from the 12th Dynasty and in display in the Fitzwilliam Museum of Cambridge and shown in Fig.10.^[19] It is manufactured from painted wood. The working team consists of three men, one of them slaughtering the ox and the other two are holding the ox in position not to move. The ox is tied from its four legs.



Fig.10 Butchers model from the 12th Dynasty.^[19]

Offering Bearers Models

The ancient Egyptians believed that there is another life in the hereafter after death. Therefore, they put models of offering bearers in the high official persons to provide them with what they need in this new life. Available models show that this started at the end of the First Intermediate Period and continued during the Middle Kingdom as will be illustrated by the following models.

- The first offering bearers model is for a female bearer from the first Intermediate Period (2150 BC) from the collection of the Eton College Myers at UK and shown in Fig.11.^[20] The bearer is carrying a box on her head, supporting the box by the left hand, and holding an object by her right hand. There is a young goat beside her right leg. The model is nicely produced from wood and painted by two colors.



Fig.11 Female offering bearer from the 1st Intermediate Period.^[20]

- The second model is for a female offering bearer from the 11th Dynasty and in display in the British Museum and shown in Fig.12.^[21] The model is produced from wood and painted by about five colors. The bearer is carrying a nicely designed and decorated basket and supporting the basket by her left hand.



Fig.12 Female bearer from the 11th Dynasty.^[21]

- The third offering bearers model is from Tomb of Djehutinakht, Overlord of the Hare nome at the end of the 11th Dynasty displayed in the Museum of Fine Arts of Boston and shown in Fig.13.^[6] It is a model of a group bearers consisting of three female bearers and one male bearer leading the group. The first and fourth bearers are carrying offers in both hands. The second and third bearers are carrying basket on their head and an offering in their right hand.



Fig 13: Group bearers from the 11th Dynasty.^[6]

- The fourth bearers model is from the end of the 11th Dynasty and start of the 12th Dynasty (2010-1961 BC) and in display in the Museum of Fine arts and shown in Fig.14.^[22] The model is produced from painted wood and consists of ten men bearers moving in two rows with a leader in the front.



Fig.14 Group bearers from the 11th/12th Dynasties.^[22]

- The fifth offering bearers model is from the 12th Dynasty from the Tomb of Meketre which in display in the Metropolitan Museum of Art at NY and shown in Fig.15.^[8] The model comprises four bearers, two female and two male bearers. The two men in the front,

then the two women. Each women is carrying a basket on her head and a duck in her right hand. The man in the front is carrying a vase and another object in both hands and the second man is carrying offerings on his head. The model is nicely produced and colored with multi-colors.

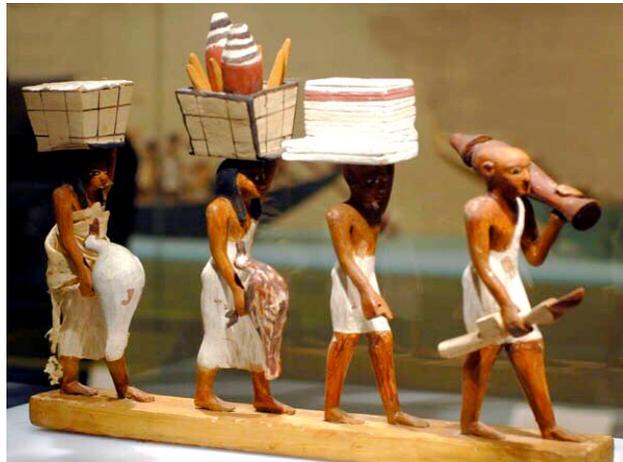


Fig.15 Group bearers from the 12th Dynasty.^[8]

- The last bearers model is a wonderful female bearer model (two separate bearers) from the 12th Dynasty from the Tomb of Meketre which are in the Egyptian Expedition of the Metropolitan Museum of Art and shown in Fig.16.^[23] The two models are extensively colored specially the clothing of the two girls. Each of them is carrying offerings in a basket and in her right hand while supporting the basket by her left hand. One can not imagine that this product was manufactured 4000 years ago with accuracy and resolution available now with aid of computer graphics.



Fig 16: Female bearers from the 12th Dynasty.^[23]

Houses Models

Ancient Egyptians were a civilized nation built structures of outstanding characteristics that could survive for thousands of years up to now. It is expected that such people will not sleep outdoors. They built houses consisting of one and two stories as illustrated by the house models they left in some of their tombs as will be illustrated here.

- The first house model is from the First Intermediate Period (2100 BC) and is on display in the Royal Ontario Museum and shown in Fig.17.^[24] It is a model for a single story house with front courtyard, front ramp, stairs to the roof which has a small balcony. Its enclosure has one door in the front and windows from the side. The courtyard has setting benches at both sides.



Fig 17: House model from 2100 BC.^[24]

- Another house model from the Late First Intermediate Period – Early Middle Kingdom (2100-1950 BC) is produced from pottery and is on display in the Metropolitan Museum of Art and shown in Fig.18^[25]. This house model consists of one story, wide courtyard, entrance ramp, two doors and four storing jars in one block.



Fig 18: House model from 2100-1950 BC.^[25]

- The 3rd house model is from the 12th Dynasty of the Middle Kingdom, produced from pottery, in display in the British Museum and shown in Fig.19.^[26] It has a big courtyard surrounding the building, one story building with one door with circular arch, one window above the level of the door with a vertical column in its middle, another door the part of the courtyard behind the building and a relatively tall wall surrounding the courtyard.



Fig 19: House model from the 12th Dynasty.^[26]

- The 4th house model is again from the 12th Dynasty produced from clay, in display in the Metropolitan Museum of Art and shown in Fig.20.^[27] The house consists of two stories, inlet courtyard with two columns in the front, an entrance ramp, second story with large balcony having three columns in its front. The walls in the first story are thicker than those in the second story. This is an excellent thinking from engineering point of view because the load on the first floor walls is greater than that on the second floor wall.



Fig 20: Clay house model from the 12th Dynasty.^[27]

- The 5th house model is from the 13th Dynasty of the Second Intermediate Period (1750-1700 BC), in display in the Metropolitan Museum of Art and shown in Fig.21.^[28] The house consists of one story, stairs to the roof, granary room on the floor of an ovoid door, front

damaged courtyard and three columns in the front of the building. The sides of the courtyard takes a rectangular shape between the floor and roof.



Fig 21: House model from the 13th Dynasty.^[28]

- The last model is from the New Kingdom (1570-1069 BC) which is a limestone model in display in the British Museum and shown in Fig.22.^[29] The model consists of three floors. The first floor comprises the door and has no windows. It may be used as a store or granary. The second and third floors have windows from all sides.



Fig 22: Limestone house model from the New Kingdom.^[29]

CONCLUSION

- The production of cattle, butcher, offering bearer and house models in ancient Egypt was investigated.
- The care of ancient Egyptians by cattle was investigated through available models from Naqada I Period to the Third Intermediate Period.
- Butcher models in ancient Egypt was investigated during a time span from the 5th to the 12th Dynasties.
- The production of offering bearer models in ancient Egypt was investigated from the First Intermediate Period to the 12th Dynasty of the Middle Kingdom.
- The authorization of ancient Egyptian housing through model building was studied covering the period from the First Intermediate Period to the New Kingdom.
- They produced models for houses of one, two and three stories.
- They used wood, clay, pottery, plaster and limestone as raw materials for model building.
- They succeeded to paint some of their models with wonderful multi-colours resulting in an astonishing artefacts.
- They produced cattle models for one animal, 4, 6 and about 10.
- They produced offering bearers models for one bearer, 4 and 10.

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BIOGRAPHY

Galal Ali Hassaan

- Emeritus Professor of System Dynamics and Automatic Control.
- Has got his B.Sc. and M.Sc. from Cairo University in 1970 and 1974.
- Has got his Ph.D. in 1979 from Bradford University, UK under the supervision of Late Prof. John Parnaby.
- Now with the Faculty of Engineering, Cairo University, EGYPT.
- Research on Automatic Control, Mechanical Vibrations, Mechanism Synthesis and History of Mechanical Engineering.
- Published more than 190 research papers in international journals and conferences.
- Author of books on Experimental Systems Control, Experimental Vibrations and Evolution of Mechanical Engineering.
- Chief Justice of International Journal of Computer Techniques.
- Member of the Editorial Board of a number of International Journals including the WJERT journal.
- Reviewer in some international journals.
- Scholars interested in the author's publications can visit: <http://scholar.cu.edu.eg/galal>

