

Mechanical Engineering in Ancient Egypt, Part XVIII: Ladies Headdress in the New Kingdom

Galal Ali Hassaan

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

ABSTRACT: *The objective of this paper is to investigate the development of mechanical engineering in ancient Egypt through ladies headdress industry in the New Kingdom. This study covers the design and manufacturing of ladies headdresses in the 18th and 19th dynasty showing the sophistication and uniqueness of some of the designs illustrating their decoration.*

Keywords –*Mechanical engineering history, ladies headdress industry in ancient Egypt, New Kingdom, dynasty 18, dynasty 19.*

I. INTRODUCTION

The ancient Egyptians were pioneers in design and production engineering specially during the New Kingdom. This fact was authorised in the jewellery industry [1] – [3], pottery industry [4], stone vessels industry [5] and faience vessels industry [6]. This research paper investigates the role of the New Kingdom in the evolution of the ladies headdress design and production.

Watts and Watts (1998) studied the art of ancient Egypt and its role in the daily life and afterlife of the ancient Egyptians. They presented tomb scenes where data can be extracted about ancient Egyptians clothing including ladies headdresses. They wrote a section about the Amarna Period during the 18th dynasty and the changes happened in the forms of art [7]. Hilliard (2006) described Hatshepsut as a female King ruling New Kingdom of Egypt while traditional queens were not acknowledged as rulers of Egypt and served instead as wives or mothers to Pharaohs. She described Nefertiti as a co-ruler due to her equality in status and power shared with her husband Akhenaten [8].

Silverman (2006) presented some statues displayed in the Penn Museum (USA) where a lot of information can be extracted about clothing of Ancient Egyptians including headdresses during the 18th dynasty [9]. Olivier (2008) analysed many artistic works for evidence for the roles of elite women in events, practices and rituals at the time

when the objects were created. She concluded that the status of elite women in the New Kingdom was significantly different and exalted in comparison with the status of their counterparts during earlier dynasties. She presented reliefs and statues where an idea can be gathered about headdress for men and women in the New Kingdom [10].

Jansen (2013) revealed that the ancient Egyptians had much in common with other ancient societies in their treatment of captured enemies. He presented a large number of scenes from which data about dressing can be extracted either for ancient Egyptians or foreigners [11]. Laboury (2014) examined how Hatshepsut, the 5th Pharaoh of the 18th dynasty, gradually constructed the image of her kingly authority. She presented a lot of scenes and statues for Hatshepsut where good idea about her dressing and headdress is obtained [12]. Robins (2015) discussed the scene of Queen Nefertiti pouring a drink for her husband Pharaoh Akhenaten, the 10th Pharaoh of the 18th dynasty, in the tomb of her steward and overseer of the royal quarters of Nefertiti. The scene is one of the sources authorizing headdress fashions in the New Kingdom [13]. Hammett (2016) investigated the use of clay balls dated from the New Kingdom to the Late Period as depicted on a number of temple walls. She discussed a scene of a Pharaoh hitting a clay ball by a stick before a deity. The scene is one of the sources of Pharaohs and Deities clothing and headdresses as inscribed by the ancient Egyptians [14].

II. LADIES HEADDRESS IN THE 18TH DYNASTY

The 18th dynasty had pioneers in all aspects of ancient Egypt life. Here, we will present samples of the use of its ladies headdresses with wonderful designs and production better than any other nations up today:

- Fig.1 shows a wooden statue for Queen Ahmose-Nefertari the wife of Pharaoh Ahmose I (the 1st Pharaoh of the 18th dynasty) as displayed in the Fondazione Museo Antichita Egizie, Turin, Italy [15].

It has a simple design of a uniform pattern with a vulture crown on its top.



Fig.1 Queen Ahmose-Nefertaei [15].

- Fig.2 shows a cedarwood coffin of Queen Ahmose-Meritamun, the wife of Pharaoh Amenhotep I, the 2nd Pharaoh of the 18th dynasty [16] and displayed in the Egyptian Museum [17]. It has also a simple design with a uniform pattern similar to that of Fig.1 except the pattern on the Queen forehead.

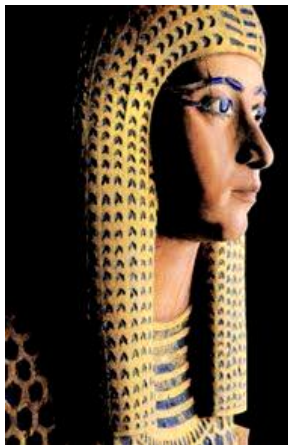


Fig.2 Queen Ahmose-Meritamun [16].

- The 3rd model is from the reign of Pharaoh Thutmose I, the 3rd Pharaoh of the 18th dynasty. Fig.3 shows a wall relief for Queen Ahmose, his wife in the temple of her daughter Hatshepsut [18]. Its design is similar to that of Queen Ahmose-Nefertari except the pattern of the headdress which is different and the vulture wings are longer.



Fig.3 Queen Ahmose [18].

- The next headdress model is a wonderful design and production from the reign of the famous Pharaoh Hatshepsut, the 5th Pharaoh of the 18th dynasty. It is a wall relief in the tomb of vizier Ramose for a woman wearing a very sophisticated headdress in its design and decoration scheme shown in Fig.4 [19]. It is wide and long covering her chest and has about 4 different decoration patterns. It is difficult to imagine that such piece of headdress is produced more than 4800 years ago. I think nowadays it required computerized knitting machines to produce it !. But, they are the ancient Egyptians whose their capabilities were leading their time.

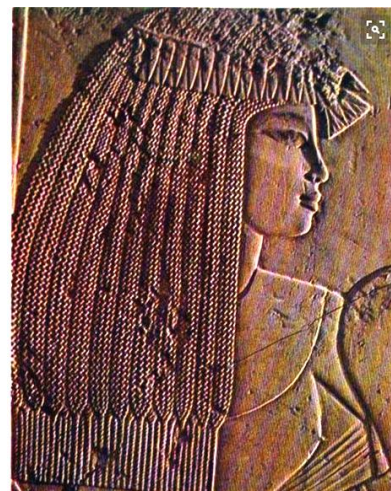


Fig.4 Lady headdress from tomb of Ramose [19].

- Another model from the reign of Pharaoh Hatshepsut is for singer Harmose displayed in the Metropolitan Museum of Art of NY and shown in Fig.5 [20]. The headdress of singer Harmose has a new design different than the four models presented in Figs.1 through 4. It has a green color, yellow thin bands longitudinally all over its area and two thick bands at its two ends.



Fig.5 Singer Harmose [20].

- The 6th and 7th models of ladies headdresses belong to the minor wives of Pharaoh Thutmose III, the 6th Pharaoh of the 18th dynasty displayed in Fig.6 [21], [22]. It has a new unique design consisting of strands emerging from a golden plate at the top of the head going down towards the neck. Each strand consists of small flowers manufactured from gold, gesso, carnelian, jasper and glass.



Fig.6 (a) [21].



Fig.6 (b) [22].

The headdress model in Fig.6 (b) has also a unique and novel design. It consists of strands of cylindrical beads manufactured from 2 different materials and arranged alternately.

- Another model from the reign of Pharaoh Thutmose III is for his mother Isis shown in his granite statue of Fig.7 [23]. It is one piece knitted headdress with zigzag motifs all over its surface. There is no other decoration.

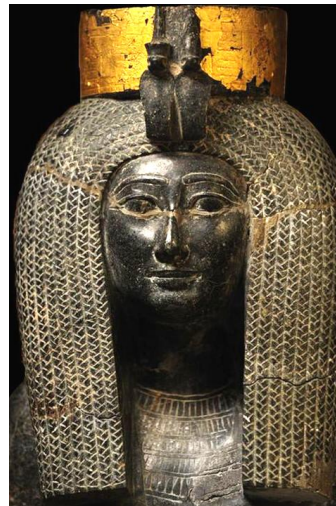


Fig.7 Isis mother of Thutmose III [23].

- The 8th model is for Mother of Pharaoh Thutmose IV, the 8th Pharaoh of the 18th dynasty, Tia displayed with her son in the Egyptian Museum and shown in Fig.8 (a) [24]. It is a one piece headdress with long sides. It is extensively decorated by different patterns through knitting. The decoration scheme is zoomed in Fig.8 (b)

to clarify the design of the decorations in the two sides of the headdress.



Fig.8 (a) Tia mother of Thutmose IV [24].



Left side



Right side

Fig.8 (b) Decorations of Tia headdress.

- The 9th model of headdresses designed and known in the 18th dynasty is for a lady called Mi during the rein of Pharaoh Thutmose IV and displayed in the Brooklyn Museum USA) and shown in Fig.9 [25]. It has a long design and nicely decorated by V-shape parallel trails covering the whole surface with lateral dashed 4-strands at the end.



Fig.9 Lady Mi headdress [25].

- The 10th model is for the temple singer Nebet-ta early in the rein of Pharaoh Amenhotep III, the 9th Pharaoh of the 18th dynasty displayed in the Brooklyn Museum and shown in Fig.10 [26]. Her headdress has a unique design. The two bands on the forehead give an indication that this headdress consists of two parts joint with each other by those two bands. The whole surface consists of thick bands of fabric and the side parts are decorated by motifs in dark-brown while the whole fabric is in a light-brown. The ends of the headdress have different pattern of parallel trails consisting of parallel lines.



Fig.10 Temple singer Nebet-ta [26].

- The 11th model is a wall scene from tomb of Nebamun scribe and grain accountant" during the rein of Pharaohs Amenhotep III (9th Pharaoh) and Akhenaten (10th Pharaoh) robbed from his tomb and located in the British Museum showing his wife Hatshepsut with her husband in a hunting trip shown in Fig.11 [27,28]. Her headdress is decorated by a strip of separated cords at the headdress end, a diadem, a perfume cone and a tree branch.



Fig.11 Hatshepsut, wife of Nebamun [27,28].

- The 12th model of ladies headdress in the 18th dynasty is for lady Resi in the reign of Pharaoh Amenhotep III through her statue found in the tomb of Amenemapt in Medinet Gurob of ancient Egypt and shown in Fig.12 [29]. Lady Rasi headdress is one of unique designs of the 18th dynasty. It has a yellow dome in its top, then zigzagged knitted fabric goes down to just bellow the shoulder with one pattern, then it ends with a band of vertical cords



Fig.12 Lady Resi statue [29].

- The 13th model is for Queen Tiye Great royal wife of Pharaoh Amenhotep III through one of her statues shown in Fig.13 [30]. Her headdress has another unique design manufactured from a rectangle motifs pattern and decorated by a vulture spreading its wings on the headdress and two cobra on the forehead of the queen. At the end there is a band of vertical cords.



Fig.13 Queen Tiye statue [30].

- The 14th model is for Queen Meritaten, the Great Royal Wife of Pharaoh Smenkhkare, 11th Pharaoh of the 18th dynasty displayed in the Louvre Museum of Paris and shown in Fig.14 [31]. Her headdress is long down to her chest and decorated by five different patterns.



Fig.14 Queen Meritaten statue [31].

The 15th model is for Queen Kiya the wife of Pharaoh Akhenaten, the 12th Pharaoh of the 18th dynasty which a lid for her canopic jar displayed in the Metropolitan Museum of Art and shown in Fig.15 [32]. It is a short headdress only down to the end of her neck. It is decorated by patterns changing in design from top to bottom of the headdress.



Fig.15 Queen Kiya canopic jar lid [32].

- The 16th model of ladies headdress in the 18th dynasty belongs to Merit, the wife of Maya, overseer of the treasury and chief of the works during the reign of Pharaoh Tutankhamun which is displayed in the National Museum of Antiquities in Leiden, Netherlands and shown in Fig.16

[33]. The headdress of Merit has a long design covering the chest and extensively decorated through its patterns and motifs of the same textile. The front is decorated by two strands of two dimensions (thick in the top and thin in the bottom, the top part has its own pattern and the rest of the headdress has parallel trails from the forehead to the end of the headdress.

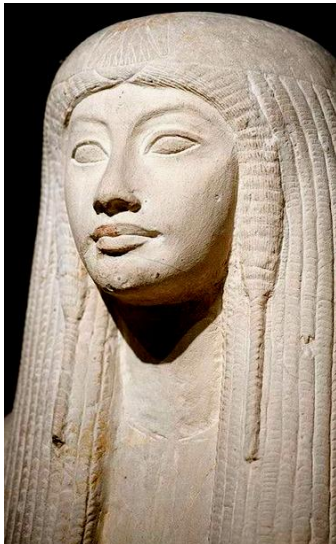


Fig.16 Statue of Merit, wife of Maya [33].

- The 17th model of headdresses in the 18th dynasty belongs to the wife of Nechtmin, the scribe of Pharaoh Tutankhamun, the 13th Pharaoh. Her Statue is displayed in the Egyptian Museum of Cairo and shown in Fig.17 [34]. Her headdress is consisted of four parts. The top part above the head has a dime design with extensive motifs, the second and third parts have similar pattern and separated by flat undecorated bands. The two parts have vertical parallel-thick trails. The last part at the end has decorating thin trails.



Fig.17 Wife of scribe Nakhtmin [34].

III. LADIES HEADRESS IN THE 19th DYNASTY

We have 7 models of ladies headdress from the rein of Pharaoh Seti I, the 2nd Pharaoh of the 19th dynasty and his son Ramses II, the 3rd Pharaoh. The 7 models are presented as follows:

- The 1st model belongs to Queen Tuya, wife of Pharaoh Seti I and mother of Ramses II displayed in Luxor Museum of Egypt and shown in Fig.18 [35]. The Queen is wearing the headdress under her crown. It is extensively decorated through knitting different patterns (three different patterns as they are generated by a computerized knitting machine.



Fig.18 Queen Tuya headdress [35].

- The 2nd model is for Hathor a colored wall scene with Pharaoh Seti I [36]. Her headdress has a unique design. It has a long fashion of dark background and orange horizontal bands near its ends with diadem above the forehead and a crown on the top of the headdress.



Fig.19 Hathor headdress [36].

- The 3rd model is a headdress for a noble in a colored scene in the tomb of Userhat in the Tombs of the Nobles at Thebes, commander of Pharaohs Ramses I and Seti I shown in Fig.20 [37]. This is a long headdress going down below the chest and has various decorations as colored horizontal bands on its top part and ended by parallel trails with wide separation.



Fig.20 Mother headdress from Userhat tomb [37].

- The 4th model of ladies headdresses in the 19th dynasty is for Renenutet, wife of Yuni displayed in the Metropolitan Museum of Art and shown in Fig.21 [38]. Its design is similar to that of the wife of Nekhtmin in Fig.7 but without the horizontal bands.



Fig.21 Statue of Renenutet wife of Yuni [38].

- The 5th model is for Queen Nefertari the Great Royal Wife of Pharaoh Ramses II, the 3rd Pharaoh of the 19th dynasty located in the Karnak Temple and shown in Fig.22 [39]. The wife of the great Pharaoh Ramses II wears a headdress of a unique design. It is extremely lengthy since it goes to under her elbow. It is decorated by a number of knitting patterns and two cobras on its front.

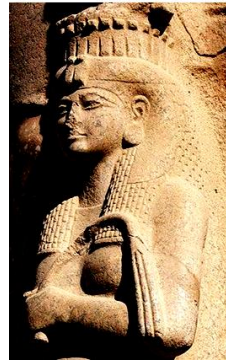


Fig.22 Statue of Queen Nefertari [39].

- The 6th model is for Meritamen, the Great Royal Wife of Pharaoh Ramses II as displayed in Akhmim of Egypt and shown in Fig.23 [40]. It is a multi-patterns headdress of long parallel trails on the forehead and top sides, then a an interchanging short trails on the back and lower sides.

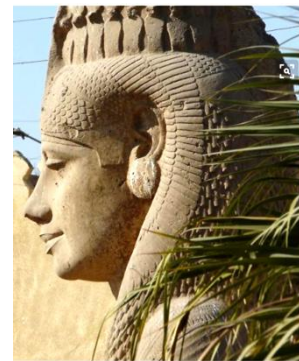


Fig.23 Statue of Queen Meritamen [40].

- The 7th model is for the Theban priestess Henutmehyt in the rein of Pharaoh Ramses II displayed in the British Museum and shown in Fig.24 [41]. It is a long headdress decorated by a domed yellow top with flower image in its front, one black pattern for all the surface and yellow bands on its down sides.



Fig.24 Sarcophagus of Priestess Henutmehyt [41].

IV. CONCLUSION

- This paper investigated the evolution of Mechanical engineering in ancient Egypt during the New Kingdom through the design and manufacturing of ladies headdresses.
- The ladies headdresses appeared in ladies statues, sarcophaguses and tombs or temple scenes.
- The study highlighted the high level design and manufacturing strategies used during the 18th and 19th dynasties specially during the rich 18th dynasty.
- The old Egyptians designed headdresses with various patterns and ranging from short to long down to the elbow.
- Some of the designs were so sophisticated in design and manufacturing.
- Wives and mothers of high officials and pharaohs worn deaddresses.
- They used different colors in decorating the designed headdresses such as brown, black, orange, green and white.
- They designed non-classical headdresses consisting if strands of cylindrical beads and flower motifs in the 18th dynasty.
- They designed headdresses with zigzag pattern, thin and thick strands and with multi-shapes patterns.
- They decorated headdresses of the Royal Wives by cobra figures on the front of the headdress.
- They used vertical and horizontal trails in decorating ladies headdresses.
- The headdress of Queen Nefertari was long and rapped around her elbow.
- They used a decorated dome in the top of their designs.
- They use diadems and cobra figures to decorate royal headdresses.

REFERENCES

- [1] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part II: Jewellery industry (Pectorals), *International Journal of Recent Engineering*, vol.19, January 2016, 25-32.
- [2] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part III: Jewellery industry (Necklaces), *International Journal of Engineering and Techniques*, vol.2, issue 1, 2016, 59-67.
- [3] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part IV: Jewellery industry (Bracelets), *International Journal of Science and Engineering*, vol.2, issue 2, 2016, 16-30.
- [4] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part X: Pottery industry (Middle to new Kingdoms), *International Journal of Science and Engineering*, vol.2, issue 4, 2016, 7-18.
- [5] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part XIV: Stone vessels (Middle Kingdom to Third Intermediate Period), *International Journal of Engineering and Techniques*, 2016, Accepted for Publication.
- [6] G. A. Hassaan, Mechanical engineering in ancient Egypt, Part XV: Faience vessels (New Kingdom to Third Intermediate Period), *International Journal of Science and Engineering*, vol.2, issue 5, 2016, Accepted for Publication.
- [7] E. W. Watt and E. A. Watts, The art of ancient Egypt, a resource for educators, *Metropolitan Museum of Art*, 1998.
- [8] K. Hilliard, Images of a genedard Kingship, visual representations of Hatshepsut and her influence on images of Nefertiti, *Master of Arts Thesis, University of North Texas*, August 2006.
- [9] D. Silverma, Amarna ancient Egypt's place in the sun,, *Pinn Museum*, 2006.
- [10] A. Olivier, Social status of elite women of the New Kingdom of ancient Egypt: A comparison of artistic features, *Master of Arts Thesis, University of South Africa*, June 2008.
- [11] M. Jansen, The iconography of humiliation: The depiction and treatment of bound foreigners in New Kingdom Egypt., *Ph.D. Thesis* , The University of Memphis, Tennessee, USA, May 2013.
- [12] D. Laboury, How and why did Hatshepsut invent the image of her royal power ?, in the rein of Hatshepsut, Edited by M. Galal, B. Bryan and P. Dorman, *Occasional Proceedings of the Theban Workshop, The Oriental Institute of the University of Chicago*, Chicago, USA, 2014.
- [13] G. Robins, Nefertiti pours a drink for Akhenaten in the tomb of her steward Merira, *ARCE 66th Annual Meeting*, 24-26 April, TX, USA, 2015.
- [14] A. Hammett, The clay balls of ancient Egypt: a sumbolic defence against Apophis, *International Conference on Ancient Egyptian Manifestation of Luminal Entities* , Swansea, Swansea University and Egypt Centre, Wales, UK, 21-24 March 2016, p.6.
- [15] A. Getz, Wooden statue of Queen Ahmose-Nefertari, www.pinterest.com/pin/232850243207658086/
- [16] O. Retro, Cedarwood coffin of Queen Ahmose-Meritamun [www.pinterest.com/ pin/211528513722603642/](http://www.pinterest.com/pin/211528513722603642/)
- [17] Egyptopia, Sarcophagus of Ahmose-Meritamun, www.egyptopia.com/sarcophogus+of+ahmose+Meritamun+The+Egyptian+Museum_30_382_448_en.html.
- [18] A. Olivier, p.146.

- [19] M. Smidt, Lady in waiting,
www.pinterest.com/pin/490259109416672738/
- [20] A. Sparks, Egyptian coffin of Harmose,
www.pintirest.com/pin/547398529681062575/
- [21] K. Keough, Wig cover, dynasty 18 rein of
Thutmose III,
www.pinterest.com/pin/547398529681062575/
- [22] H. McLean, Wig from one of the
Thutmose minor wives grave,
www.pinterest.com/pin/283867582736271467/
- [23] G. Giorgio, A black granite statue of Isis,
www.pinterest.com/pin/545076361122295331/
- [24] D. Down and J. Ashton, The Pharaoh and
the Sphinx,
<http://answersingenesis.org/archaeology/ancient-egypt/the-pharaoh-and-the-sphinx/>
- [25] A. Preston, Statue of lady Mi standing,
www.pinterest.com/pin/72850842998285/
- [26] R. Williams, Nebsen, a scribe in the royal
treasury,
www.pinterest.com/pin/22736148116448282805/
- [27] Wikipedia, Nebamun,
<http://en.wikipedia.org/wiki/Nebamun>, 2016.
- [28] L. Yamaoka, Wall scenes from the tomb of
Nebamun and his wife Hatshepsut,
www.pinterest.com/pin/31243791141808763/
- [29] J. Pickett, Statue of lady Resi from the
Madinet Gurob tomb of Amenemapt,
www.pinterest.com/pin/381750505887001552/.
- [30] G. Gootjes, Queen Tiye, Greet Royal Wife of
Pharaoh Amenhotep III,
www.pinterest.com/pin/3265110417143575/
- [31] M. Mayotte, Merytaten, Great Royal
Wife to Pharaoh Smenkhkare,
www.pinterest.com/pin/263038434463429138/
- [32] Wikipedia, Kiya,
www.http://en.wikipedia.org/wiki/Kiya, 2016.
- [33] N. Bulle, Merit, 18th dynasty,
www.pinterest.com/pin/411023903469522065/
- [34] L. Wennberg, The wife of Nakhtmin,
www.pinterest.com/pin/46443439879308582/
- [35] Wikipedia, Tuya – Queen,
http://wikipedia.org/wiki/Tuya_queen, 2016.
- [36] K. Harper, Pharaoh Seti I and Hathor,
www.pinterest.com/pin/386676317978422175/
- [37] Alamy, Mother, tomb of Userhat,
www.alamy.com/stock-photo-mother-tomb-of-userhat-1313-1292-bc-new-kingdom-reign-of-seti-i-thebes-26985918.html
- [38] Metropolitan Museum of Art, Yuny and
his wife Renenutet,
www.metmuseum.org/art/collection/search/544740

[39] S. Plessis, Nefertiti Karnak Temple
Complex,
www.pinterest.com/pin/528539706241495543/

[40] D. Elhard, Colossal Meritamen statue,
www.pinterest.com/pin/186336503307913799/

[41] British Museum, Coffin,
www.britishmuseum.org/collection/online/collection_object_details/collection_image_gallery.aspx?partid=1&assetid=410874001&objectid=158614.

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 170 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 IJRES..
- Reviewer in some international journals.

- Scholars interested in the authors publications can visit:
<http://scholar.cu.edu.eg/galal>