

RESEARCH PAPER

**EXPLORING FRY AND DREW'S APPLICATION OF GHANAIAN SYMBOLISM IN ARCHITECTURAL ORNAMENTATIONS: CASE STUDY OF OPOKU WARE AND PREMPEH SENIOR HIGH SCHOOLS IN KUMASI, GHANA**

\*K. Adjei<sup>1</sup> and R. A. Oppong<sup>2</sup>

<sup>1</sup>Department of Industrial Art, College of Art and Built Environment, KNUST, Kumasi

<sup>2</sup>Department of Architecture, College of Art and Built Environment, KNUST, Kumasi

\*Corresponding author: [adjei44@yahoo.com](mailto:adjei44@yahoo.com)

**ABSTRACT**

*Ghanaian art forms are dominated by symbolism that characterises the socio-cultural, religious and political ideals of the people. These symbols which are often used in religious, and socio-political buildings for educational, aesthetic and religious purposes encapsulate Ghanaian thoughts, beliefs, ideas, aspirations and spirituality in abstract forms. The objective of this study is to explore the significance, philosophical and socio-cultural narratives embodied in the symbols that are employed in the architectural ornamentation of Maxwell Fry and Jane Drew's architectural project in Opoku Ware Senior High and Prempeh Senior High Schools in Kumasi. This study employed the qualitative method of research using observation, library research and photographic documentations. The data were analysed using the interpretivist research method. The results of the study show that Fry and Drew's application of Ghanaian symbols in school architecture at Opoku Ware Senior High and Prempeh Senior High Schools in Kumasi exemplify their response to contextualising indigenous sensibilities in design. The symbols which were mainly the stool, crocodile from the adinkra symbology and honey comb motifs were generally employed as precast concrete for the dual purpose of serving practical and aesthetics demands of the schools' architecture. The study concludes that the stool, crocodile and honey comb motifs symbolise authority, status, power, versatility and assiduousness, and their deployment in the architecture of these two schools is a negotiation of the Ashanti Royal authority and symbolic power that is derived from western academic experience.*

**Keywords:** *Opoku Ware Senior High School, Prempeh Senior High School, Maxwell Fry, Jane Drew, Ghanaian symbolism, architectural ornamentations*

**INTRODUCTION**

Ghanaian art forms are dominated by symbolism that characterises the socio-cultural, religious and political ideals of the people. These symbols translate the Ghanaian thoughts, beliefs, ideas, aspiration and spirituality in ab-

stract forms. This practice of using objects to represent abstract ideas has been a common denominator in Ghanaian and African art in general. This phenomenon is generally known as symbolism. Symbolism has been defined to mean the use of abstract characters to represent

objects, functions, processes or ideas (Gilbert, 1998). In Ghana these symbols appear in the form of adinkra (Owusu, 2019; Rattray, 1927; Alabi, 2020; Rimpsey, 2013; Aboagyewaa-Ntiri *et al.* 2018), gold weights (Quarcoopome, 2017) umbrella and linguist staff tops (Kuwornu-Adjaottor *et al.*, 2015) as well as geometric symbols that are often found on pottery, textile, metal, woodcarvings and other indigenous art forms. Symbolism has been deployed in ornamentations of religious and socio-political buildings to educate and connect the public to their creator and leaders (Asante *et al.*, 2015). These symbols also serve as sources of power and identity to the communities where they are used.

Indigenous Ghanaian art places emphasis on specific parts of the body for symbolic meaning. For example, the head is believed to have a special role in defining a person's destiny and success in life and therefore it is often projected proportionately larger than the body. Traditional Ghanaian artists also employ scale for symbolic effect in multiple figure compositions, where the most important individuals are depicted as the largest figure, while those of lesser importance are smaller in size (The Metropolitan Museum of Art, 2006). Symbolism has been key in Ghanaian communication networks. It is opined that the Ghanaian and African worldview in general is full of symbols which serve as foundation for understanding their way of life (Mensah, 2010). Seth (2013) asserted that symbols occupy the core of our social and cultural world. These works of art are channels through which human beings communicate important aspects of their culture and history (Metropolitan Museum of Art, 2006).

Different types of these art forms are fused into traditional Ghanaian architecture as ornamentations for psychological, religious, communicative and socio-political significance and are often employed at locations of potential social interaction such as palaces, temples and shrines (Smikle, 2019). Ornamentation is defined as an element of art or architecture that helps to improve the aesthetic qualities and the depth and legibility of its symbolic meanings. It is considered as a constant human demand which is virtually used by all cultures as an intrinsic part of

artistic works (Mitrache, 2012). Ornamentations in architecture allow for interaction and contemplation for cultural, historical and spiritual fulfilments. It has the ability to instigate feelings, experiences, histories, and references to the user of an object. Peterson (2017) noted that, ornamentation is history, current, timeless and variable, and has been perceived as luxury in the past. According to Heathcote (2015), it is the medium through which architecture communicates with the broader public.

The subject of ornamentation has not been prominent in the discourse of Maxwell Fry and Jane Drew's architectural practice in many literatures. The British architects Maxwell Fry (1899-1987) and Jane Drew (1911-1996) who were married couple and business partners were appointed as Town Planning Advisors to the colonial Resident Minister and Chief of Staff in West Africa. Some of the cities they developed plans for in West Africa are; Accra, Kumasi, Freetown and Lagos (Jackson and Holland, 2016; Winterhalter, 2015). Kumasi, the capital of Ashanti region of Ghana, is culturally conservative and considered as the cultural hub of the country (National Commission on Culture, 2007). Kumasi has very rich culture and history stimulated by the Asantehene, the King of the Asante people (Arhin, 1970). The Ashanti and for that matter Ghanaians have sophisticated taste for beauty which is expressed in their art forms.

Some of the important architectural projects undertaken in Ghana by Fry and Drew are the Opoku Ware Senior High and Prempeh Senior High Schools in Kumasi. An important element in their work in West Africa is the development of architectural idiom that combines sculptural precast concrete balusters and *brise soleil* to provide sunshade and decorative effect to their buildings. More important for this study is their ornamentations that referenced the cultural heritage of Ghana. As opposed to Fry and Drew's narrative, contemporary Ghanaian architects have not explored much symbolism for the ornamentations of public architecture, and there is a huge gap in literature, especially in school architecture. School buildings in Ghana before and after independence have generally been constructed in the modernist style of architec-

ture; rectangular straight walls and simple windows, with no provision for detailing and meaning for contemplation (Morgenthaler, 2015; Backović *et al.*, 2010; Elrayies, 2018). The objective of this study is to explore the philosophical and socio-cultural narratives embodied in the symbols that are employed in the ornamentations of Maxwell Fry and Jane Drew's architectural projects and their significance to the architecture of Opoku Ware Senior High and Prempeh Senior High Schools in Kumasi

### **Literature review**

This section reviews literature on symbolism in architectural ornamentations, Ghanaian symbolism and Maxwell Fry and Jane Drew's architectural practice with particular interest in their practice in Ghana.

### **Symbolism in architectural ornamentations**

Human beings employ communication processes in everyday life experiences through meaning deduction. Since the ancient times, people in all cultures have naturally symbolized their experiences with their environment in graphic forms (Seth, 2013). Meanings are created out of the association between these graphic forms and the object symbolized (Abraham, 2005). Symbols that have been created throughout the world are simplified abstractions of complex realities, where the visible represents the invisible (Abraham, 2005). Symbols are visual images or signs representing an idea. The ability to use symbols through identification and understanding of their meaning helps to enrich people's lives.

Symbols in religious ornamentations generally identify the respective faith. From the medieval cathedral ornamentations to the gorgeous calligraphic symbols of the Koran, identities have been created through symbolism in architecture (Holm, 2001, Seth, 2013). Seth (2013) classified symbolism into five namely; cosmic symbolism, natural world symbolism, human life symbolism, myths and religion, society and culture. He claimed that symbolism in architecture has always been linked to power and status. Symbolism has been employed as a visual language and are generally used in art and architecture for communication and identity crea-

tion. Symbolism and ornamentations are characteristically found in the art of the ancient nomads (Bunker, *et al.*, 2002).

According to Astakhova (2020) the most complex and difficult part of creativity in architectural creation is the production of the symbolic form. Therefore, picturesque and sculptural images are used to explain the meaning of the architectural form in a simpler language. These symbolic forms are often rendered as ornamentations in architecture.

It is argued by George (2005) that, since architecture is not a mere design of buildings or habitats that are simple physical enclosures, but on the contrary a communication of thoughts, preferences, beliefs and emotions in built form it must symbolically speak and impart significance to its users. He stressed that serious architecture must have a strong moral and social core that has a mantle of the manifested. Symbolic meanings mostly emerged from a religious foundation or the contextual orientation of the user. It therefore extends that the external forms of architecture with its features must communicate beliefs, culture and its concepts which is shared by the collective consciousness of the individual's origin (George, 2005).

### **Ghanaian symbolism**

There are many ways through which Ghanaians communicate their thoughts and feelings. These communications are often done through symbols, proverbs, songs and dirges (Kquofi *et al.*, 2013). Ghanaians employ both verbal and non-verbal channels for communications. Verbal communications are expressed in oral forms while non-verbal ones are done through symbols (Kuwornu-Adjaottor *et al.*, 2015). The most important collection of symbols among Ghanaians is the Adinkra symbols. Adinkra symbols are symbols through which stylized pictures transmit the philosophy of the Akan people of Ghana (Owusu, 2019). Rattray (1927) recorded fifty-three samples of adinkra symbols and their meanings in his book; "*Religion and Art in Ashanti*" while Alabi (2020) postulates that there are over 400 adinkra symbols. These symbols are developed through observations and associations between humans, animals, flora and fauna, the human

body and its parts, and elements of nature and abstract concepts (Danzy, 2009).

Traditional symbols present translations of thought and ideas that express and symbolize the values and beliefs of the people among whom they occur (Kuwornu-Adjaottor *et al.* 2015). These images have often become symbolic by having certain ideas or proverbs imposed on them. Rimpsey (2013) described the Adinkra symbols as graphic and ideographic construction that communicate both linguistically and pictorially. The artefacts that are expressed in symbolic art forms in Ghana are textiles, pottery, stools, jewellery, umbrella tops and linguist staff tops (Kuwornu-Adjaottor *et al.* 2015). Adinkra symbols are often incorporated into the above art forms including walls and other architectural features as ornamentations. In addition to the symbols' illustration that captures evocative messages that express traditional wisdom and aspects of life or the environment, they also have ornamentation functions (Ayensu, 2015).

Another important symbolic art form is the stool. The stool is both real and abstract, functional and symbolic. It is one of the common types of wood carvings in Africa, south of the Sahara, and particularly in Ghana. Patton (1979) underscored four main functions of the stool in Ghana namely; utilitarian, rites of passage, as sacred object, and political symbol. The stool is a very important symbolic object for Ghanaians, particularly for cultures in the south of Ghana. In southern Ghana, every chief has one or more stools which he uses to identify and legitimise his rank. They are important symbols of political, judicial, and social leadership (Patton, 1979). Their role as political symbol is demonstrated by the fact that the term "stool" may denote and define the office of a chief and his officials (Osei, 2002; Kumah, 2009). The stool is used as a symbol of chieftaincy, royalty, custom and tradition. Queen mothers may publicly sit on the traditional stool as a seat of authority that communicates messages about the nature of their leadership (Hale, 2013).

### **Maxwell Fry and Jane Drew's architectural practise in Ghana**

Maxwell Fry, a British architect and town planner was born in Liscard, Wallasey, England in August, 1899 and died in September 1987. From 1920–23 Fry studied at School of Architecture, Liverpool University. Walter Gropius, Ludwig Mies van der Rohe, Le Corbusier and Pierre Jeanneret are some of the important modernist architects who worked with Fry (Bahga, 2019). Fry's reputation as a key figure in the development of the British Modern Movement cannot be contested. He was amongst the first British architects to complete a building in concrete with white and symmetrical form, a style that became common with modern architecture (Rimsa, 2020).

Just like Maxwell Fry, Dame Jane Drew was an English modernist architect and town planner. She graduated from the Architectural Association School in London and became one of the principal proponents of the Modern Movement in London before World War II (Jackson and Holland, 2016; Rimsa, 2020). During and after the World War II, Drew actively designed social and public projects in England, West Africa, India, Sri Lanka and Iran (Guppy, 1996; Bahga, 2019). She was together with her husband and business partner, Maxwell Fry in West Africa and designed schools and universities. She wrote books about her architectural practice in different countries and also helped to establish the Institute of Contemporary Arts in London.

Among some important projects that were undertaken by Fry and Drew in Ghana are: Prempeh and Opoku Ware Senior High Schools, Kumasi; St. Monica's School, Mampong; Community centre in Accra, with Mosaic mural on the front façade by Kofi Antobam; Adisadel, Mfantsipim, and Wesley Girls' Senior High Schools, Cape Coast; St Francis College of Education, Hohoe; Amedzofe Senior High School and Presbyterian College of Education, Amedzofe; Mawuli Senior High School, Ho; Aburi Senior High School and College of Education, Aburi; St. Joseph's College of Education, Bechem; Apowa Roman Catholic; College of Education, Takoradi; Community Centre at Tarkwa, Low and High

grade houses in Tema and Leventis store, Accra. Above all, one important feature of their designs in Ghana was their concern to respond to the indigenous cultural orientation of the people.

#### **RESEARCH METHOD**

This study employed the qualitative method of research ((Maggs-Rapport, 2001; Silverman, 2005; Kumar, 2011; Bengtsson, 2016) using observation, field note, library research and photographic documentations (Yeldirim and Yuksel, 2015; Urquhart, 2015). This study is an extract from the first author's ongoing PhD dissertation. Primary data was collected from Opoku Ware and Prempeh Senior High School campuses while the secondary data was obtained from the Kwame Nkrumah University of Science and Technology (KNUST) library and from the internet. In order to get access to these schools' premises to carry out the research, official letters from KNUST, were sent to the respective school's Heads to obtain permission. After permissions were granted, initial survey was carried out in the schools to observe and identify the various areas of interest to the researchers. This was followed with observation and photographic documentation of the various ornamentations on these campuses. The exercise went along with literature review from the library which sought to know more about these buildings and their history. The data were analysed using the interpretive research method. The secondary data from the library was used to support the primary data that were collected from the schools' campuses.

#### **FINDINGS AND DISCUSSION**

This section provides the findings and discussions of the study. It sets out to provide overview of the two schools under study and proceeds to provide images of the symbols and discussion of the symbolism and ornamentations in the architecture ([http://www.owassmag.com/p/blog-page\\_24.html](http://www.owassmag.com/p/blog-page_24.html)).

On the other hand, Prempeh Senior High School was founded in 1949, three years before Opoku Ware Senior High School, through a collaboration between the Asanteman Traditional Council, the British Colonial Government, and the Methodist and the Presbyterian

Churches of the then Gold Coast. Prempeh Senior High School is a public boys' school located in Kumasi, Ashanti Region of Ghana. The school was named after the King of Ashanti (Asantehene), Sir Osei Tutu Agyeman Prempeh II, who donated the land on which the school was built. Prempeh Senior High was the first school project designed by the renowned British modernist Architects Fry and Drew in Kumasi.

#### **Ghanaian symbolism in Fry and Drew's architecture**

Fry and Drew were influenced by the African propensity for ornamenting their artefacts and developed a more expressive architecture for school designs employing 'local motifs' and symbolic references in Ghana. Fry and Drew's works at Opoku Ware Senior High and Prempeh Senior High Schools in Kumasi exemplify their response to indigenous sensibilities in their architectural designs. It was this style of architecture that established their reputation in the canon of 'tropical modernism', which they continued to work in Africa until the 1960s (Liscombe, 2006). Opoku Ware Senior High and Prempeh Senior High Schools were originally planned, designed and supervised by Fry and Drew. The architecture of these two schools resonate the Ashanti culture with the use of the stool, crocodile symbol and other geometric forms. The architects employed ornamentations that are essentially rooted in Ghanaian cultural narratives. The architects used mainly Ghanaian traditional symbols as motifs for the design of the buildings' mouldings. The British plan for new schools during the latter part of their rule in Ghana was aimed at achieving a higher standard of architecture that served a moral purpose (Jackson and Hollard, 2016).

Fry and Drew responded to this demand by creating architecture that had practical concerns for the environment and culture. They achieved this objective by designing architecture that was both symbolic and practical in character. They used the cultural symbolism of the adinkra, the stool and other traditional motifs to produce practical architectural characters such as sunbreaks, lattices and other screenings as well as breeze-permitting devices. In Figs 1 and 2, the stool symbol was employed as motif for



**Fig. 1:** Stool symbol cast in concrete moulding used as sunbreaks and ventilation device that is also appreciated for its socio-political and educational significance



**Fig. 2:** Stool symbols cast in relief on the front façade of the Assembly Hall of Prempeh Senior High School

mouldings and relief ornamentations on the buildings of Opoku Ware and Prempeh Senior High Schools respectively.

These applications sought to explore the practical, aesthetic and symbolic significance of the stool symbolism in architecture of schools that have direct link to the Ashanti royal court. The

mouldings were applied for the practical purposes of breaking the direct tropical sun from entering the hall, provision of ventilation and for aesthetics.

The stool symbolises authority, status and power (Hale, 2013), and its deployment in the school architecture of Opoku Ware Senior High and Prempeh Senior High Schools expresses negotiation of the Ashanti Royal authority and the political administration of the colonial authority. The symbolism of the stool in school architecture also explores the conversations and historical narratives where traditional authorities have championed developmental projects for their communities. In this conversation the stool does not only represent socio-political power (Osei, 2002; Kumah, 2009; Patton, 1979), but also that which is derived from western academic experience. The narrative explored socio-political and aesthetic significance of the stool in contemporary artistic conversations. It also echoes the role of education in the economic, social, and political empowerment of the individual. The simplicity of the stool's rendition arranged in horizontal and vertical

symmetry and linear composition create complex network of negative spaces that allow for the penetration of sunlight and natural circulation of air in the hall at Opoku Ware Senior High School (see Fig. 1). The dark voids in the wall created by the stool mouldings contrast with the characteristic white-washed colour of the modernist architecture. The white colour signifies purity in Ghanaian colour symbolism and evokes the purity of knowledge acquired through education (Antwi, E. and Kquofi, 2015; Ayiku, 1998). It also denotes joy, hope and wellbeing (Hagan, 1970), the ideal state of human personhood that education is expected to provide. Also, at Prempeh Senior High School, the stool is cast in relief and arranged on vertical columns projecting from the walls of the school's Assembly Hall which represents the seat and citadel of scholarship and spirituality of the school. The arrangement of the long columns hosting the stool ornamentations create repetition and balance that lead the viewer's attention in vertical symmetry (Fig. 3).

The symbolism in the ornamentations in Fry and Drew's work at Opoku Ware Senior High

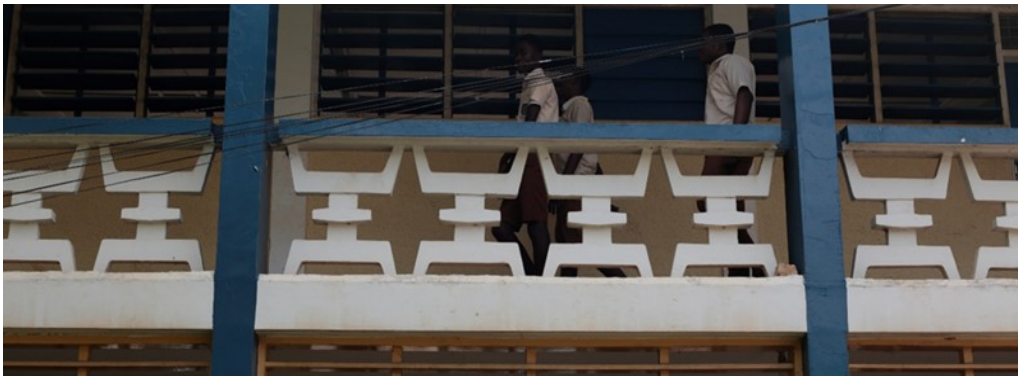


**Fig. 3: Assembly Hall of Prempeh Senior High School showing the long columns hosting the stool ornamentations that create repetition, balance and vertical symmetry**

and Prempeh Senior Schools echoes Ghanaian philosophy of adoptability and power. The crocodile motifs employed as balustrades for the class room blocks at Opoku Ware (Fig. 4) and as simple geometric patterns in tessellating forms to create sunbreaks and lattices for the dormitories and pathways that link the administration to other parts of the school's infra-

structure at Prempeh (Fig. 5) also bear a lot of symbolic and philosophical significance.

The crocodile symbolises adoptability, versatility and wit in Ghanaian symbolism. It represents the crocodile's ability to live in both water and on land (Rimpsey, 2013). The meaning of the motif and its application in school arch-



**Fig. 4:** The crocodile motifs employed as balustrades for the class room blocks also bear a lot of symbolic and philosophical significance



**Fig. 5:** The crocodile motif employed as simple geometric patterns in tessellating forms to create sunbreaks and lattices for the pathway that link the administration to other parts of Prempeh Senior High School



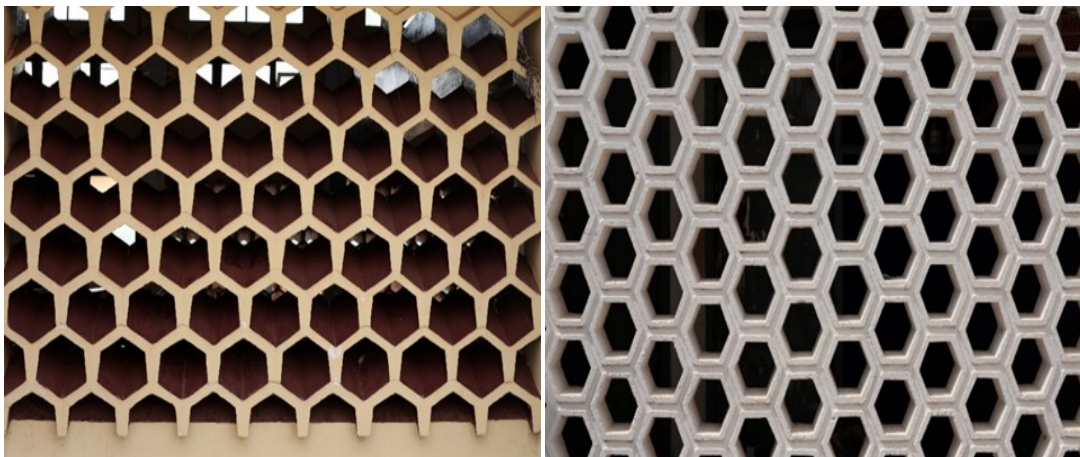
itecture interprets the need to harness western and traditional education for the creation of wholistic and versatile individuals in the society. The crocodile motif exhibits abstraction, simplicity, balance and symmetry. The repetition of four motifs in between two columns generate a sense of cell that creates rhythm and balance. The white and blue colours express contrast and project the white painted symbols from the cells. The abstraction of crocodile in Fig. 4 mimics and choreographs human beings collaborating to lift a weight in a determined disposition. The symbolism in Opoku Ware school building is one of Fry's works that resonates traditional philosophy of adoptability and power. Again, the repetition of the motif creates voids that mimic the star, a symbol in Ghanaian philosophy that communicates hope and excellence (Fig. 4).

Furtherance to this conversation is the use of abstracted renditions of the honey comb design (Fig. 6) used as sunbreaks and ventilation permitting device. The bee is noted for its characteristics of assiduousness, independence, association and defensiveness. The honey comb design symbolises the bee, and its application in school architecture signifies the need to inculcate these rich qualities in students. The

honey comb design explores the narrative of assiduous and enterprise, independent in thinking, communal in action and nationalistic in defence of national cultural heritage.

#### CONCLUSION

The study explored the significance of the stool and crocodile symbols as well as the honey comb designs in school architecture for their socio-political and educational contexts. The stool symbolises authority, status and power and its deployment in the architecture of these two schools is a negotiation of the Ashanti Royal authority and symbolic power that is derived from western academic experience. The crocodile also symbolises adoptability, versatility and wit while the honey comb expresses assiduousness and enterprise, independence in thinking, communal in action and nationalistic in defence of national cultural heritage. It was observed that Fry and Drew contextualised their architectural designs along Ghanaian cultural symbolism. One of the key points in this study is the contextualisation of these designs with particular reference to the significance of the stool and the crocodile symbols to the Ashanti royal court and their relevance to the education of Ghanaians.



**Fig. 6: Two different renditions of the honey comb design used as sunscreens, for ventilation and aesthetic appeal at the Opoku Ware Senior High School**

Symbolism is an important feature in Ghanaian cultural expression. Symbolism has been used in the ornamentations of traditional Ghanaian architecture for psychological, religious, communicative and socio-political reasons. Fry and Drew's architectural works in Ghana explored some of these symbols and patterns for school architecture. In the case of Opoku Ware Senior High and Prempeh Senior High Schools, the stool and crocodile symbols as well as the honey comb designs were generally employed as precast concrete for the dual purpose of serving practical and aesthetics demands of the architecture. These solutions came in the form of brise soleil, sunbreaks, ventilation devices and finally as ornamentations for aesthetics and meaning.

#### REFERENCES

- Aboagyewaa-Ntiri, J. Champion, C. B. and Kemevor, A. K (2018). Extension of knowledge on Ghanaian adinkra symbols in relation to Maslow's theory. *International Journal of African Society Culture and Tradition*, 6, (2):25-38
- Alabi, J. (2020). Adinkra symbols: A comprehensive list with meanings in Ghana. <https://yen.com.gh/109014-adinkra-symbols-a-comprehensive-list-meanings-ghana.html> Accessed on 12/05/2020.
- Antwi, E. and Kquofi, S. (2015) Covered in Some Colours: Use and Meaning of Paint to Asante and Kassena Nankana Ethnicities of Ghana. *Advances in Social Sciences Research Journal*, 2 (10): 51-61.
- Arhin. M. K. (1978). Gold-mining and trading among the Ashanti of Ghana, *Journal des Africanistes*, 89-100.
- Asante, E. A., Kquofi, S and Larbi, S (2015). The symbolic significance of motifs on selected Asante religious temples, *Journal of Aesthetics and Culture*, 7: (1) DOI: 10.3402/jac.v7.27006 <https://www.tandfonline.com/doi/full/10.3402/jac.v7.27006>. Accessed 10/12/2020
- Astakhova, E. (2020) Architectural symbolism in tradition and modernity, IOP Conference Series: Materials Science and Engineering, 913, 032024
- Ayesu, S. M. (2015). Empirical study of Akuapem Odwira Festival and traditional state symbols: A means for design and production of textile regalia for Akuapem Paramount Chief, Masters thesis, Kwame Nkrumah University Science and Technology. <http://dspace.knust.edu.gh/bitstream/123456789/8147/1/AYESU%20SOLOMON%20MARFO%20.pdf>. Accessed 15/09/2020
- Ayiku, R. K. (1998). Symbolic Meanings in the Ghanaian arts: A step towards developing cultural literacy, Doctor of Philosophy thesis presented to Concordia University, Canada. [https://www.collectionscanada.gc.ca/obj/s4/f2/dsk1/tape7/PQDD\\_0017/NQ43588.pdf](https://www.collectionscanada.gc.ca/obj/s4/f2/dsk1/tape7/PQDD_0017/NQ43588.pdf). Accessed on 12/09/2020
- Bahga, S. (2019). Maxwell Fry-Designed, India's first glass-façade Government Press Building at Chandigarh, revisited, India Architecture News <https://worldarchitecture.org/article-links/eccvc/maxwell-frydesigned-india-s-first-glassfacade-government-press-building-at-chandigarh-revisited.html>. Accessed on 14/03/2020.
- Backović, V. and Maširević, L. (2010). Social theory and architecture <https://www.scribd.com/document/188180576/Postmodern-Architecture-Theory>. Accessed on 10/ 9/ 2019.
- Bunker, E. C., Watt, J. C. Y and Sun, Z. (2002). Nomadic Art of the Eastern Eurasian Steppes: The Eugene V. Thaw and Other New York Collections: Metropolitan Museum of Art. <http://resources.metmuseum.org/resources> pdf. Accessed on 09/ 08/2020
- Danzy, J. (2009). Adinkra Symbols: An ideographic writing system, a thesis presented to the Graduate School in partial fulfilment of the requirements for the degree of Master of Arts in English Stony Brook University. <https://dspace.sunyconnect.suny.edu/bitstream/>

- handle/1951/48176/000000570sbu.pdf. Accessed on 20/05/2020
- Elrayies, G. M. (2018). Cities' Identity through Architecture and Arts. In: Catalani et al. (Eds) *Cities' Identity Through, Architecture and Arts*, Taylor and Francis Group, London, UK.
- Fry, M. (1975). *Autobiographical sketches* hardcover, London: Elek Publishers, First Edition.
- Gilbert, R. (1998). *Living with art*. New York: McGraw-Hill Companies.
- George, A. (2005). Development of symbolic pedagogical tools for communication in architecture, Study of Architectural Symbolism, Department of Mechanical Engineering, NIT Calicut, University of Calicut. <https://docplayer.net/58627230-Study-of-architectural-symbolism.html>. Accessed on 11/12/2018
- Guppy, S. (1996). Obituary: Dame Jane Drew Independent. <https://www.independent.co.uk/news/people/obituarydame-jane-drew-1307641.html>. Accessed on 14/10/2019.
- Hagan G.P. (1970) A note on Akan colour symbolism. *Research Review, VII (1): 8-13*.
- Hale, C. M. (2013). Asante Stools and the Matrilineage. Doctoral dissertation, Harvard University. [https://dash.harvard.edu/bitstream/handle/1/11004913/Hale\\_gsas.harvard\\_0084L\\_11004.pdf?sequence=3&isAllowed=y](https://dash.harvard.edu/bitstream/handle/1/11004913/Hale_gsas.harvard_0084L_11004.pdf?sequence=3&isAllowed=y). Accessed 11/2/2021
- Heathcote, E. (2015). *The problem with ornament, the Architectural Review*, EMAP Publishing limited, London.
- Jackson, I. and Holland, J. (2016). *The architecture of Edwin Maxwell Fry and Jane Drew: twentieth century architecture, pioneer modernism and the tropics*, Routledge.
- Liscombe, R. W. (2006). *Modernism in late imperial British West Africa the work of Maxwell Fry and Jane Drew, 1946-56*. *Journal of the Society of Architectural Historians, 188-215*
- Kumah, D. (2009). *Stools in Asante Culture*, a thesis submitted to the school of graduate studies, Kwame Nkrumah University of science and Technology in partial fulfilment of the requirements for the degree of Master of Arts African art and culture, Department of General Art Studies. <http://ir.knust.edu.gh/bitstream/123456789/326/1/STOOLS%20IN%20ASANTE%20CULTURE-CONTENTS.pdf>. Accessed on 20/02/2020
- Kuwornu-Adjaottor, J. E. T., Appiah, G. and Nartey, M. (2015). The philosophy behind some adinkra symbols and their communicative values in Akan. *Philosophical Papers and Review, 7(3): 22-33*.
- Maggs-Rapport, F. (2001). "Best research practice": In pursuit of methodological rigour. *Journal of Advanced Nursing, 35: 373-383*.
- Mensah, O. (2010). *Evoking the identity and character of African art, Architecture and History through cultural buildings: The Case of Cape-Coast*, a Master thesis submitted to the Department of Architecture, Kwame Nkrumah University of Science and Technology in partial fulfilment of the requirement for the degree of Master of Architecture. <http://dspace.knust.edu.gh/bitstream/123456789/383/1/March%20Theses%20Final.pdf>. Accessed on 03/08/2019.
- Mitrache, A (2012). Ornamental art and architectural decoration, *Procedia - Social and Behavioral Sciences, 51:567 – 572*
- Morgenthaler, H. R. (2015). *The meaning of modern architecture its inner necessity and an empathetic reading*, London and New York, Taylor and Francis Group.
- National Commission on Culture (2007). Kumasi, the "Garden City" Cultural News, Daily Graphic <https://culture.gov.gh/index1.php?linkid=65&archived=1007&page=1>. Retrieved 19/11/2018.

## 99 Adjei and Oppong

- Osei, K. (2002). An outline of Asante history. Kumasi: Cita Press
- Owusu, P. (2019). Adinkra symbols as “Multivocal” pedagogical/socialization tool, *Contemporary Journal of African Studies* 2019; 6 (1): 46-58.
- Patton, S. F. (1979) The Stool and Asante Chieftaincy, *African Arts*, 13, (1): 74-99.
- Peterson, A. (2017). Ornament theory and design, Yale School of Architecture <http://architecture.yale.edu/gallery/untitled-25>. Accessed on 09/ 12/ 2019.
- Quarcoopome, N. O. (2017) The Akan gold weights collection at the DIA, Bulletin of the Detroit Institute of Art. <https://www.journals.uchicago.edu/doi/pdf/10.1086/DIA910014> Accessed on 10/06/2019.
- Rattray, R.S. (1927). Religion and Art in Ashanti. London, Oxford University Press. Pp 216-269.
- Rimpsey, S (2013). The Abstract Text: Adinkra Symbolism as a Narrative in Drawing, Independent Study Project (ISP) Collection, 1678. [https://digitalcollections.sit.edu/isp\\_collection/1678](https://digitalcollections.sit.edu/isp_collection/1678). Accessed on 07/02/2020.
- Rimsa, C. (2020). Jane Drew, British architect, Encyclopædia Britannica, Inc. <https://www.britannica.com/biography/Jane-Drew>. Accessed on 24/04/2020.
- Seth, H. (2013). Iconographic architecture as signs and symbols in Dubai: A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy, the University of Wolverhampton. [https://wlv.openrepository.com/bitstream/handle/2436/303485/Seth\\_PhD%20thesis.pdf?sequence=6&isAllowed=y](https://wlv.openrepository.com/bitstream/handle/2436/303485/Seth_PhD%20thesis.pdf?sequence=6&isAllowed=y). Accessed on 06/10/2020.
- Silverman, D. (2005). Doing qualitative research (2nd ed.). Thousand Oaks, CA: Sage Publications. pp1-12
- Smikle, H. (2019) Mathematics of Ornaments and Architecture, Curriculum Units by Fellows of the Yale-New Haven Teachers Institute 1993 Volume I: The Symbolic Language of Architecture and Public Monuments, Yale-New Haven Teachers Institute, Yale University. <https://teachersinstitute.yale.edu/curriculum/units/files/93.01.10.pdf> Retrieved - 01/02/2021
- The Metropolitan Museum of Art (2006). The art of Africa a resource for educators, The Metropolitan Museum of Art, New York. <https://www.metmuseum.org/-/media/files/learn/for-educators/publications-for-educators/the-art-of-africa.pdf> . Accessed on 10/03/ 2020.
- Winterhalter, S. M. (2015). Building a New Nation: The Modern Architecture of Ghana, A Thesis Submitted to the Graduate Faculty of the University of Georgia in partial fulfilment of the Requirements for the Degree Master of Historic Preservation Athens, Georgia [https://getd.libs.uga.edu/pdfs/winterhalter\\_shannon\\_m\\_201705\\_mhp.pdf](https://getd.libs.uga.edu/pdfs/winterhalter_shannon_m_201705_mhp.pdf). Accessed on 02/05/2020.
- Yussupova, A., Songfu, L., Namazbay, A., Rahimian, F. P. Ebrahimi, A. N. (2017) Ornamental art and symbolism: Activators of historical regeneration for Kazakhstan’s landscape architecture, Archnet-Ijar. *International Journal of Architectural Research*, 12 (3): 193-213.