

J. Max Bond Jr. and the appropriation of modernism in a library design in Ghana's hot-dry climate

Allan Balaara, Errol Haaroff and Alessandro Melis

Abstract

The paper draws on Bond's architectural influences and critical thoughts on architecture in the context of his design response in the Bolgatanga Regional Library, to advance the idea on hybrid modernism in postcolonial Ghana. Bond considered the Library his first independent work and the most profound. However, as an architect-academic working alongside some of the celebrated modernist practitioners, Bond's Library appears fairly influenced. Bond's expression of modernism in the Library reflects the mediation of three cultures: the northern vernacular building culture and the weather; the principles of Western modernism; and his hybrid experiences. His response, much like other socio-climatic responses known to late tropical practices in Ghana, demonstrated how the architecture of the marginalised¹ manifesting in concrete, also constitutes a reflection of the postcolonial mediation of space. Bond achieved this through relating to both the ideological² and experiential³ approach to modernist regionalism.

Introduction: The Bolgatanga Regional Library and the scope of current publications

The Bolgatanga Regional Library, located in the hot dry conditions of North-East Ghana, is one of many post-independence⁴ literacy interventions in underprivileged communities. The goal to decentralise the culture of reading by bringing purposed libraries closer to the doorsteps of those in remote areas in Ghana was timely. The development of regional libraries and subsequently district libraries were to augment the challenges faced earlier with access. Mobile van services had sporadically served these communities until then.

The Library receives prominence in architectural discourse by the nature of its commission. By virtue of its location in a rural community at the time, Bond and the Ghana Library Board (as clients) were keen to develop a concept closer to known vernacular practices there. The resultant composition therefore draws from the architecture of the immediate setting. The Library is recognised among pioneer works in the area of sustainability⁵. It is celebrated for the non-reliance on air conditioning, while maintaining internal comfort levels⁶. The building is described as an “essay in form”, better appreciated from the accomplishment of its parts rather than its overall outlook⁷. The Library presently accommodates other out-of-service uses, such as Sunday church services, in addition to its core function. A recent visit to the Library reveals significant deterioration and leakages due to poor maintenance regimes. However, the architecture is unaltered and its significance is intact.

Among many deliberations⁸ on the Library, three main publications give detailed architectural accounts⁹. The most recent by Ola Uduku focuses mainly on the composition of the Library and its plural use over time without altering its original make and function. The article briefly describes the passive cooling strategies of the Library design. In addition, the relationship between Le Corbusier’s mannerisms in design and Bond’s sculptural composition and use of open plan spaces¹⁰ receives a passing mention. The article does not give a detailed critical view of the architect and the Library, but instead emphasises the present adaptive use.

The second article by Hannah Le Roux draws on the Bolgatanga Regional Library to advance the idea of architectural mediation. For example, she notes that the Library is perhaps one “that most strongly drew from African forms”¹¹. Furthermore, she constructs a relationship between rural studies conducted by the work colleagues of Bond at the KNUST¹² School of Architecture and how these enhanced Bond’s independent engagement¹³.

The reading of Bond’s architecture in the aforementioned is drawn from his detailed account of the Library in the article “A Library for Bolgatanga”¹⁴. Bond gives a tacit description of the local Frafra house and its form between the seasons. While Bond is explicit in the symbolic expressions of the vernacular in the Library composition, responses to climate are his subjective views with potentially connected readings from the knowledge of the vernacular. Although he does not explicate the climatic relationship between vernacular responses and the Library in exact terms, he simply admits that the design was influenced by the local climate¹⁵.

It appears a critical view of the thoughts and architectural inclinations of Bond and how they influenced his design output in the form of the Library is yet to be realised. The detailed reading of the hot, dry climatic conditions and their relationship to vernacular responses in the context of the Library concepts potentially extends Bond’s limited account of his responses to the climate, learning from the vernacular. For the advancement of “hybrid” modernism¹⁶ in former colonies, the unique position of the Library and the architect is also potentially crucial. This paper seeks to establish the interconnectedness between Bond’s thoughts and architectural influences at the time of the Library commission and its place in the design composition.

Overview of the architectural character of regional libraries of the humid zone in Ghana

The development of regional library buildings in Ghana, post-World War II, coincided with the pluralism of modernism in former colonies. During this time, Ghana or the Gold Coast was heavily

reliant on expatriate architects¹⁷ whose practices were divided between technically minded technoscientific responses that emphasised the climate, and interventions that mediated climate as well as indigenous architectural knowledge. The library architecture of the humid zone mostly emphasised the former and appropriately responded to the humid climate.

A typical climatic response to a library design in this zone affords maximum cross ventilation while adopting minimal shading to mitigate the effects of driving rain and glare¹⁸. The objective is to have libraries light in composition as much as possible. This usually results in generous fenestrations¹⁹. For example, the Ashanti Regional Library²⁰, designed by a Lagos based architect, incorporates large areas of high level adjustable louvre windows and is supplemented with “breathing blocks”²¹ at the external wall base to facilitate air movement within spaces. Similarly, the Sekondi Regional Library has large areas of glazed openings to enhance ventilation²². The appropriation of depths for shading and reduction of glare within this climate are common to these library architectures. The Ashanti Regional Library in Ghana has a long running verandah, which shades and connects adjoining rooms. It is also characterised by the prominence of concrete hoods over windows to reduce excessive glare (see figure 1-right). The Kenneth Scott Eastern Regional Library in Koforidua (1955) has its roof projected beyond the enclosing walls supported on free-standing columns for effective shading while the generously glazed facades allow for ventilation. Similarly, the children’s section and exhibition halls in the Accra Central Library²³ visually convey the character typical of climatic related architectural expressions in the humid zone. Openness, light and shade is a common theme. The building fabric incorporates a double skin façade. The inner façade utilises large glass panels and the external is ceramic tile screens to facilitate ventilation and provide some minimum amount of shade for the openable glass panels (see figure 1- left).



Figure 1. Left: the exhibition hall of the Accra Central Library depicts the openness of the external walls that shade the second fabric made of openable glass panels. Right: the Ashanti Regional Library displays the shading, long running verandah, concrete hoods as well as large areas of louvered windows on the façades.

The biography of Bond Jr. (1935-2009) and his architectural influences

J. Max Bond Jr. belonged to an elite, educated African American family of Louisville Kentucky. The Bonds were exceptionally high achievers compared to other black families in America. There were high expectations with every Bond generation²⁴. J. Max Bond Jr. followed the footsteps of his seniors in the challenging profession of architecture. Bond's interest in architecture began during his father's time as Dean at the Tuskegee Institute where he spent time fondly admiring its beautiful architecture. He eventually entered Harvard College graduating in 1955 with a BA degree and an MA three years later. In the School, he was advised to quit architecture by one of his Professors as the profession was considered non-suitable for black practitioners.

Bond's travels with his father as a serving academic were opportunities of first-hand learning in architecture in new territories. In addition, Bond's association especially with Hilyard Robinson and Le Corbusier's, as well as his exposure to late tropical practices in Ghana upon his arrival in 1964,

shaped his design responses. Bond designed the Bolgatanga Regional Library in 1965. The Library could thus be described as the sum of these prior experiences.

Bond's influences from within (pre-1964)

Bond was influenced by his inside exposure to several of the best African American Architects at the time such as Juliana Abele²⁵, Hilyard Robinson²⁶, and Paul Williams²⁷. Bond appeared to associate with the hybrid creativity of Paul Williams, the socially inspiring context-based practice of Robinson, and the commitment to scale and proportions of Abele. However, he denounced the stereotypical promotion of architecture as style (typical of the Abele era), and the commodification of architecture, in particular, of the commercial commissions of Paul Williams²⁸.

Bond had the strongest affinity to the modernist practices of Hilyard Robinson's residential architecture for various reasons. Robinson's dynamic play with scale and proportions and the appropriation of the social and cultural context critically influenced Bond's responses in architecture. He recounts his time with Robinson as stimulating.

“Hilyard Robinson, of Washington, DC, though less known today than either Abele or Williams, is the architect among the three to whom I feel most sympathetic. When I visited his office as a young architect, he was generous with his time and discussed various issues of Modernism in a way that went to the heart of my interests and concerns. Captivated by both the person and the work, I especially appreciated the intimate scale and dynamic proportions of his residential buildings [...] Langston incorporated well-designed open spaces, sensitively scaled details, and artwork of the ‘social realism’.”²⁹

The situated responses of Robinson's architecture recollect the distinct context-based approaches to modernism that produced many dialects globally. Robinson's inclination to contextual modernism interested Bond greatly³⁰.

Bond's influences from without- pre 1964

The development of Bond's critical architectural cognitions from without commenced with Le Corbusier and later in Ghana, where he began a career in academia. In 1958, as a Fulbright Scholar, Bond worked as an apprentice to Le Corbusier in his Paris Office under the direction of Andre Wogenscky³¹. Although he never got to see Le Corbusier, his later practice and architectural interest strongly recalled those of Le Corbusier and his new self during and after the 1930s. In relation to the Library, three principles mainly connect Bonds interventions to Le Corbusier's work. First, Le Corbusier's critical adaption of modernism to local conditions in new territories was a cornerstone for Bond's architectural engagement. The priori considerations of social structures and climate in Le Corbusier's forms³² retained a strong presence in the Library. For example, in Chandigarh, Le Corbusier appeared inspired by the local weather and its relationship to humans. Wogenscky noted, upon his return from his first trip to Chandigarh, that Le Corbusier had indicated, "out there, Wogenscky, we will do a very different town planning [...] because out there, in the evening, people carry their beds on their backs and go to sleep outside"³³. Such mediation of climate through the conditioning of daily activity broken up between the morning and evenings³⁴ is prominent in the Bond Library. Secondly, the synergetic effusions of creativity – of poetic spatial beauty, of the visual and tactile, light and shade, and scale and proportions are discerned in the Library. Thirdly, Le Corbusier's sculptural take on modernism represented in his later works, especially in Chandigarh and the Ronchamp Chapel, have a positive presence in the Library.

Bond in Ghana and his work at the Ghana National Construction Company (1964-1965)

Bond returned from his sojourn to France in 1961 to work as an Architect in the New York firm Pedersen and Tilney before relocating to Ghana in 1964³⁵. Ghana was a beacon of hope for the Pan-African network who took interest in the success of the newly independent State and wanted to contribute to its post-independence development. Ghana hosted prominent figures including

Muhammed Ali, Maya Angelou, Malcolm X, and W.E.D Du Bois among others. Bond is the most notable in architecture. Bond's shared interest in Ghana came through friends³⁶ who were considering or had already returned to the homeland. Bond's wife, Jean was also connected to the promotion of Pan-Africanism and the American Civil Rights Movement through Freedomways. However, it was not until Bond got a job offer from the Ghana National Construction Company (GNCC) following a telegraph to Nkrumah that the decision to visit Ghana was taken³⁷.

From 1964-1965, Bond worked with the GNCC³⁸ as the Chief Architect directly responsible for projects at the seat of government (Flagstaff House)³⁹. Bond witnessed the separation of architectural practice between British practitioners (who mainly were in private practice) and Architects from the Socialist East⁴⁰ during his time in Ghana⁴¹. He identified with the Socialist bloc⁴². Political resilience by the Socialist oriented government meant an alliance with architects from the East. This was a means to decolonise architectural practice, which was dominated by British practitioners⁴³. Bond embraced the GNCC as he was more likely ideologically inclined to Nkrumah's vision and strategy of development through the GNCC. Thus, with the overthrow of the socialist government in 1966 and the demise of Nkrumah's vision of postcolonial development, Bond's return to America seemed imminent.

Bond was commissioned by the government, in his private capacity, through the Ghana Libraries Board to design⁴⁴ the Library during his time at the GNCC, shortly before he joined the KNUST School of Architecture in late 1965. Designs by architects at the GNCC at the time mostly "appear as points in their personal creative trajectories"⁴⁵. However, Bond familiarised himself with designing for this kind of climate and culture following extensive research into building design in Ghana pre-1964.

The nature of modern architectural practice in Ghana as of 1964

Bond experienced, at first hand, the context of modern architecture in Ghana upon his arrival. By 1964, modern architecture in Ghana had transitioned from an earlier focus on climate issues, to emphasis the social task of architecture towards architectural identity⁴⁶. This seems to represent the emerging global perspective on modernism in general. For example, at the 1953 CIAM meeting in Aix-en-Provence, a presentation by Candilis-Josic-Woods that emphasised the place of inhabitants, their habits and living conditions towards architectural development, had challenged the scope of earlier modern architectural practices⁴⁷. In former colonies such as Ghana, postcolonial concerns and issues of globalisation necessitated the rethinking of tropical modern practices⁴⁸.

In Ghana, Drew and Fry were noted for their developing planning approach that integrated socio-climatic thinking in the planning and design of settlements such as Tema Manhean⁴⁹. Their intervention, through the School building programme (1949-1957)⁵⁰ that was considered to be humanist⁵¹, often integrated vernacular knowledge of ‘customs and social practices’ with technical responses to climate and topography⁵². Similarly, the Harry Reese approach in the former United States Embassy building in Accra appealed to local context, beside climate; especially of the vernacular architecture of coastal regions through form composition and materiality. This sort of approach to design, looking to the vernacular perceived as reductive modernism, indicated the emerging direction of modern architecture in Ghana before Bond’s arrival.

Bond’s Library concept reflects these strategies although his design responses fairly differed by the nature of his commission, the climatic context and the specific locality. Bond connects with the building culture upon his arrival in Ghana as the intersection of three concerns, namely, a “Strong traditional architecture, and varied from region to region [...] Responsive to climate, agriculture, and lifestyle [...] and] Modern buildings for new institutions and in cities”⁵³.

At the KNUST School of Architecture (from 1965)

Bond designed the Library prior⁵⁴ to joining the School in 1965. However, the School mirrored the focus of, especially, late tropical practices, and of research-led architectural mediation, which interested Bond greatly. Bond embraced inclusive architectural practice and the opportunity to teach in a hybrid School of Architecture at KNUST was enticing. The School represented a bridge for various architectural networks in Ghana at the time. Bond worked alongside academics from diverse societies, from the West, Socialist East, Africa and Asia⁵⁵. Bond taught “theories of proportions and form” as an area of interest⁵⁶. Bond together with Lutz Christians administered the third year design studio. They developed programmes that brought them and the students in contact with the social and environmental realities of rural architecture in Ghana. The social and environmental studies were prioritised in the School’s curriculum in planning and design courses. The challenges of planning were related to the challenges of design. Thus, appropriating architecture prompted appropriating planning strategies emanating from indigenous forms and tectonics. The philosophy of the School was thus concentrated around two themes; “tradition teaches” and “technology teaches”⁵⁷. These encounters further shaped Bond’s growing love for place-centred responses in architecture.

Bond’s articulations on architecture as a sum of his influences

As an academic, Bond had a number of publications to his name. He also granted several interviews, including his experience with Thomas Dutton⁵⁸. His critical thoughts on architecture are deeply embedded in his writings and interview accounts. Most of these accounts were published after the design of the Library. However, they are a reflection of his pre-1964 experiences in America and the knowledge of architectural development in Ghana. As Bond observes, his “Later work [...were] all influenced by [...his] work in Ghana and [...the] sense of the impact of the economy, climate, culture, and location on buildings. Each building tells a story and conveys meaning to its users”⁵⁹.

Three themes, namely, the socio-cultural, the climate, and his hybrid background, underpin Bond's thoughts on architecture. Firstly, Bond's inclination to the place of social-cultural expressions in architecture is quite apparent. Bond observes that architecture's connection to locality and time is deeper compared to other forms of art⁶⁰. For Bond, the meaning of architecture is its place within the context of the larger environment or setting. Bond was opposed to the reduction of architecture to an isolated discourse of single buildings without recourse to context. Instead, architecture must express context, and the spirit of the activities it inhabits⁶¹. According to him, the market-driven approach to practice only serves the market but not the people⁶². Thus, Bond shows strong affinity to preservation practices when he indicates,

“Preservation movements have a similar kind of implication. There is a greater emphasis on the context, on the response to an existing situation rather than on the object alone. Preservation and urban design point to the larger issue of architecture in the public realm, in the social/cultural context. Yet we, by emphasising the individual architect's work, deny the social and cultural importance of any creative act [...] so preservation could suggest that architecture and its creation are really part of a social context, a result of society's creative impulses rather than that of the individual. This is not to discount the individual creativity but to put the creative act into a social context.”⁶³

Although Bond discounted himself as a regionalist, he expressed himself in terms reminiscent of Paul Ricoeur's paradox of mediating local traditions, yet participating in universal civilisation⁶⁴. It is a fundamental principle that sums up Bond's view of modern practices in architecture. For example, Bond noted that he does not “believe that modern designers exist in cultural isolation” and therefore the challenge of how to “be part of the Modern world and yet express our particular place within it” is crucial⁶⁵. The place of the social-culture in modernist practices prompted Bond's critique of modernism as a canon, and modernity in general. He did this in a context, which situated the client-architect relationship within the remit of contingent responses. In his article “Still Here: Three architects of Afro-America”, Bond raises fundamental questions suggestive of the failings of

modernism. He underscores the dissonance of modernism in its all-embracing and profound purity coming at the back of absolutist inclination.

“Moreover, is our pervasive tendency to judge buildings purely on aesthetic grounds perhaps too narrow? Did Modernism err in proclaiming itself the one true style, “the International Style” no less, and in fostering a type of architectural criticism that often denies context, that fails to acknowledge place as a critical factor in the evaluation of buildings? Do we architects really want to be—does society need us to be—“high priests” of pure design? Should the people who will inhabit the spaces we create have a better recognized and more authoritative role in the design process than is currently assumed to be acceptable?”⁶⁶

Bond’s critique echoes the focus of late tropical practices advanced earlier, as well as Robinson’s inclination to contextualized modernist responses.

Secondly, Bond’s affinity to the socio-culture was partially born out of his leaning to the weather⁶⁷ as the author of context-based architecture, similarly echoed by Jonathan Hill⁶⁸ and Le Corbusier⁶⁹. With reference to Africa, Bond denounced the banality of the too regular homogenous⁷⁰ narrative of conditions in Africa. In his view, this potentially limits the range of socio-cultural, topographical and climatic conditions that promote unique architectural responses. Bond was keen to contribute to this distinct space of postcolonial practice in the former British colony. Bond developed an understanding of the socio-climate typical of Drew and Fry commissions⁷¹, and its relationship to the regional vernacular strategies as a basis for his design responses. In several accounts, with particular reference to Africa, Bond underscores the primacy of the physical and the human/ social factors as dual agents of the development of tectonic architectures. In his draft lecture notes on architectural practice in Africa, Bond accentuates the relational duality of the physical and consequential indigenous mechanisms, adapted in different climates and across seasons.

“At the scale of a continent the physical and human factors affecting building create so many variables as to make it virtually impossible to speak of one African architecture. Yet one can

learn some common principles by studying how physical and social factors affect ‘the form and content’ of buildings [...] climate and weather. Not only does the climate-hot/ humid, hot/ dry, temperate, high veldt or low veldt-affect the design of buildings, it also affects the building process. Buildings need to be more open to maximise ventilation in hot/ humid climates. The available building materials are different from one climate zone to another, and determine the type of construction. Buildings must also be made to survive different conditions.”⁷²

Thirdly, Bond regarded himself as a hybrid. This includes his great love for diversity and multiculturalism and their potential for the development of meaningful architectures. This is clear in his suggestive views on an ideal School of Architecture, and his interest in the strengths presented through partnerships and multicultural alliances in practice. He sought to convey in his architecture the ambivalence of spatial representation that is translated through the mediated concepts of the Bolgatanga Library. As an African-American, Bond considered his constituency as neither African nor American but unique in themselves with the growth of a strong hybrid culture, of positive creativity. Bond indicates in his interview with Thomas Dutton that, although African-Americans are African by colour, and historically and culturally connected to the motherland Africa, they cannot regard themselves as Africans. The desire to retrace cultural roots to Africa is very problematic in his view. African-Americans are mistaken “when they do not accept the strength of their own culture in America and hark back to Africa”⁷³. Bond promoted African-American culture in America, of music, dance and literature as unique, authentic and therefore, of a higher value⁷⁴.

As an academic, Bond believed the most engaging and thought-provoking architectural Schools are those of racial diversities. This presents students and academics with the rare opportunity to engage, intermingle and generate great hybrid ideas by learning from diverse cultures. Thus, teaching students of such diversities was always an exciting experience for him. For Bond, good architecture emerges from the frontiers of derivative meanings; the diversity of cultural, social and climatic conditions over centuries leads to the creative mind of various races working towards mediated practices⁷⁵.

Bond's interest in the socio-cultural, climate and multi-culturalism in shaping architecture found a meaningful expression in his practices, especially the Bolgatanga Regional Library, which retained a strong hybrid identity that is typical of late tropical practice in Ghana at the time.

The Library as positive mediation

The context

While the development of libraries in Ghana's humid zone was aided by tried and tested strategies due to the high concentration of colonial building culture there, the hot dry belt posed a new challenge to modernist architects. The underdevelopment and rural sociology implied the library needed to convey meaning on several fronts beyond the science of comfort. Bond's design formed part of other positive experimental interventions in the hot dry belt, especially in terms of physiological comfort. These included Patrick Wakely and Khamil Mumtaz's proposed school building concepts⁷⁶, although strategies differed.

Bond's response represented the nexus of an experiential translation of the socio-climate to an ideological modernist inclination. The Library is perhaps the single project that reflects Bond's thoughts on architecture. It is also where his critical approach to practice recalled those of his mentors. As he indicates, "anyway, it will be my first real building in that I designed it completely and supervised every aspect of the working drawings, so you will be able to see what I think about Architecture, at least what I think about it right now."⁷⁷ Bond spoke highly of the Library, especially on how it formed the foundation for his architectural engagements since⁷⁸. Bond noted with conviction in a letter to his parents that the Library would emerge amongst others, as the new image of architecture in Ghana⁷⁹.

The indigenous architecture of Northern Ghana, particularly the Frafra domestic architecture, was critical to Bond in two ways. His inclination for context-based solutions as opposed to the

commodification of practice was foremost. Secondly, the development of the Library at the time was symbolic and transactional for the promotion of literacy in a remote community. For Bond, the Library needed to represent context in an expressive form. Bond's professional view matched with the specific design guide of the Ghana Library Board (GLB) at the time for the design of libraries in that part of Ghana. The GLB wished that the Library be uniquely designed as a symbol of literacy through diverse but informative expressions in architecture⁸⁰.

Bond's response to climate appropriated the knowledge of the weather and its relationship to the development of vernacular architecture⁸¹. It reflected the translation of the physiological, psychological, and experiential character of domestic Frafra architecture. Bond's desire to relate to the material culture was limited by several factors. At the time, no local building authority would permit the use of landcrete blocks for "a prominent modern building"⁸² such as the Library. In the hot dry belt, timber is also scarce and rarely used for buildings. Both of these were initially proposed by Bond but were considered unsuitable. Thus, the Library is constructed from stuccoed concrete blocks with special blocks moulded for the window frames⁸³. The use of concrete had become increasingly localised over time. It was the predominant material for building construction, especially in urban areas. Bond defined placeness, however, through the nature of the indigenous Frafra architecture. Bond's architectural responses⁸⁴ confirm the abstraction of the visual and tactile, as well as the appropriation of the Environmental Behaviour Relations (EBR)⁸⁵ of indigenous Frafra architecture. Eleftherios Pavlides relates to this approach to the study, and appropriation of the vernacular concepts in the context of modernist architectural mediation as ideological, and experiential⁸⁶.

Bond connected primarily to the seasons, and how these appeal to the visual and tactile conception of placeness in Frafra architecture. He revealed that "during the rainy season the savannah surrounding the town of Bolgatanga looks like a vast stretch of uninhabited farmland. As the dry season approaches and crops are harvested, the Frafra house begins to emerge and spot the landscape"⁸⁷. The Frafra house, much like the Kasena's to the West (see figure 2), consists of fractal

complexes of concentric rooms linked-up by connecting walls that define a series of open courtyards⁸⁸. Each space, including those for domesticated animals, are clearly delineated as individual units within the whole composition. Increasingly, the circular forms are interspersed with rectangular and square plan forms. Despite the changing form, roundness is a common feature to both (see figure 3). Walls taper from a wide base narrowing towards the top. Some of the rooms have a thatched roof. Others are flat mud construction with access stairways used for drying food produced during the day and for night time living during the rainy season⁸⁹.

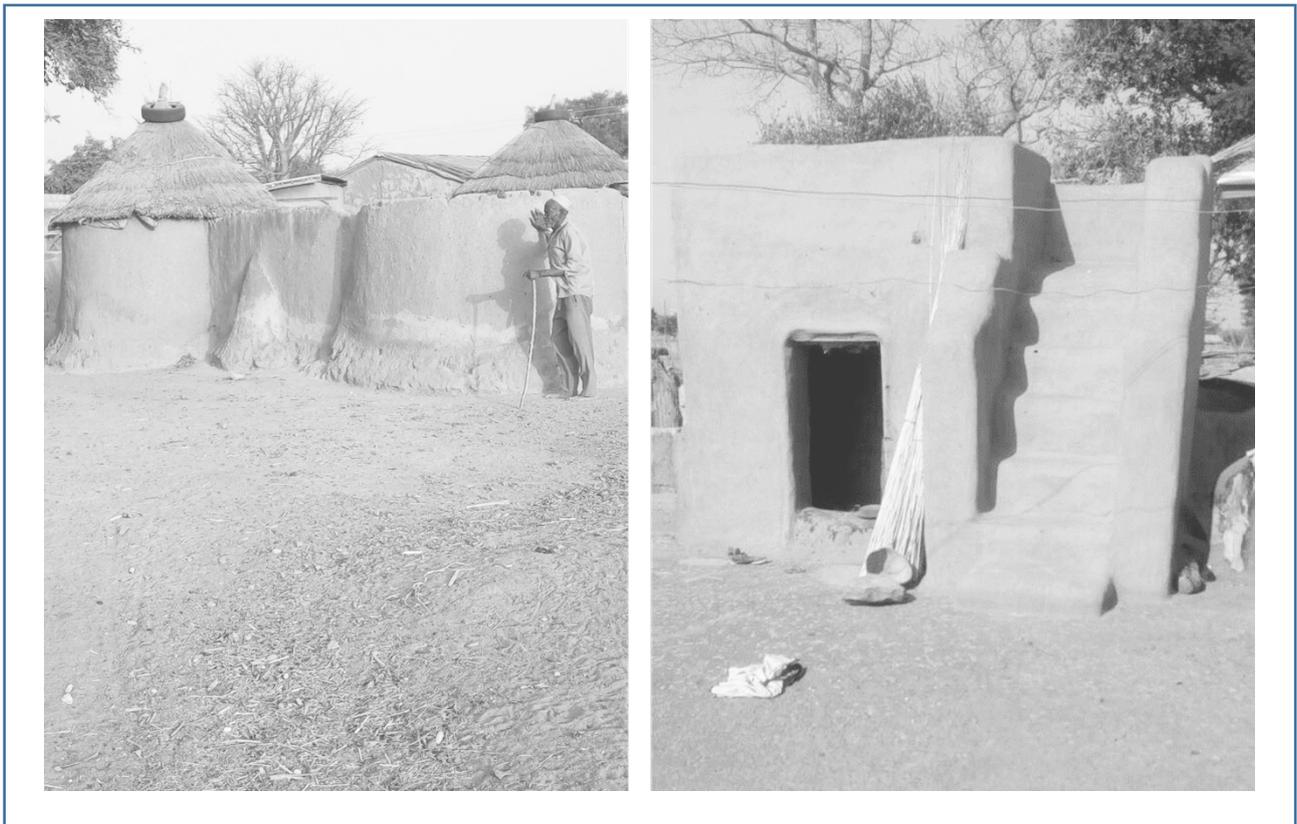


Figure 2. Left: Frafra domestic architecture, depicting round forms of flat and conical thatched roofs. Right: emphasis on access to the flat roof top from within the courtyard, which is an alternative space for night time living.

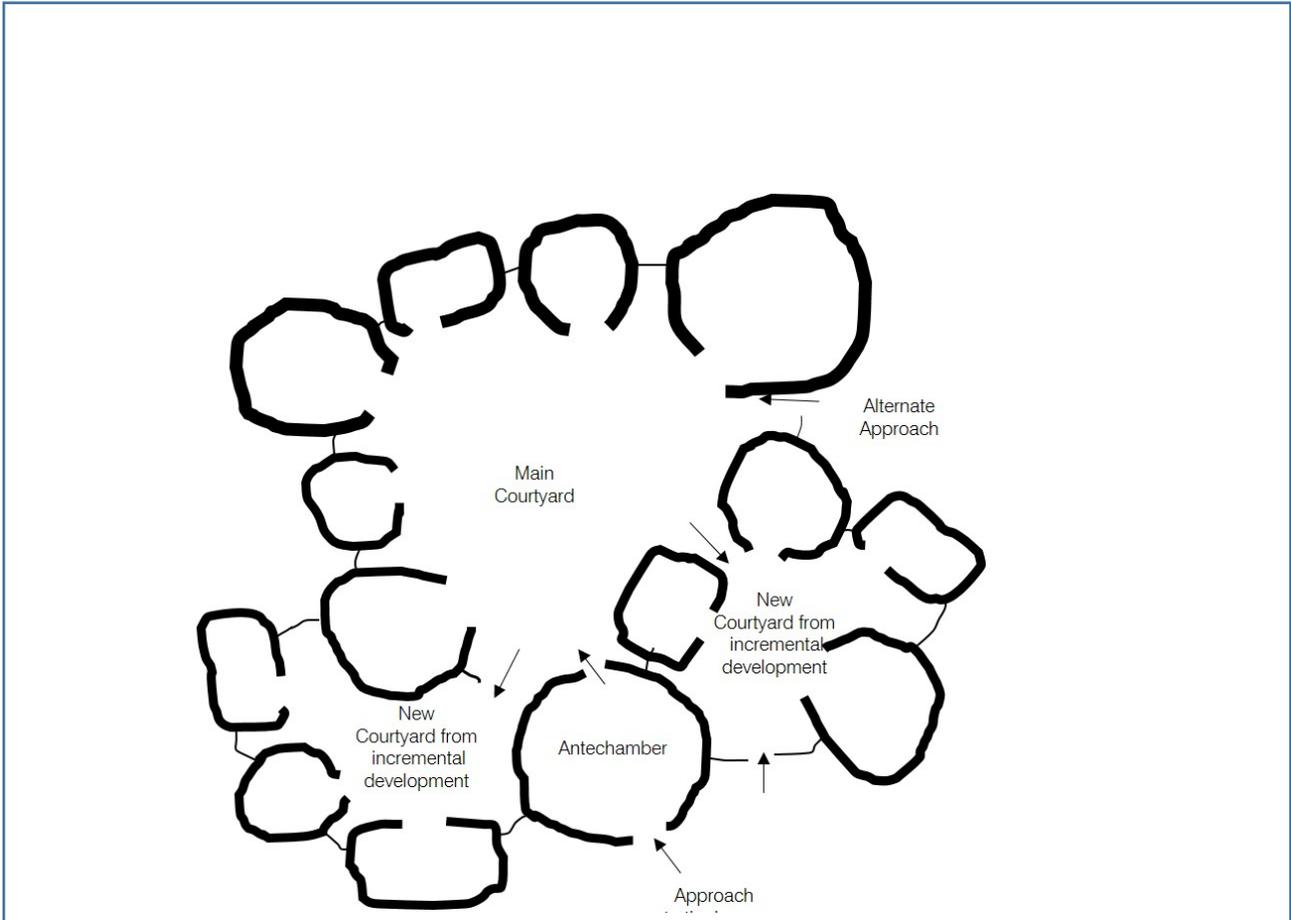


Figure 3. Schematic layout of typical Frafra domestic architecture indicates the concentric forms, interlacing of concentric and rectilinear forms, and in-between courtyards.

These principles of the indigenous Frafra architecture are consequently abstracted in the Library. Bond's approach, in many respects, reflects hybrid modernism. Bond appeared magnanimous when he denounced himself as a regionalist. He indicated that, in some instances, "although I am not particularly fond of regionalism in architecture, the design of this Library was very much influenced by the traditional domestic architecture of Northern Ghana"⁹⁰. Bond did not appear to embrace the limitations of classical terminologies. However, critical practice is consistent and dominant in his designs. Bond related to context through the knowledge of indigenous Frafra domestic architecture

in three ways: the knowledge and appropriation of climate as a physical condition; developmental planning; and the abstractions of forms through dynamic composition.

The strategies

The local climate, vernacular responses, and the Library concepts

The positive mediation of climate is largely associated with the umbrella roof⁹¹. Bond did not construct a climatic relationship between vernacular strategies and his design responses, except broadly indicating that the library responds to and was influenced by the local climate and architecture. The attempts to read the climate strategies of the Library through technical design recommendations for the hot dry Savannah climate are, however, fundamental to vernacular practices.

Bond achieves effective comfort conditions through a conscious response to the dual requirements of ventilation, and simultaneously reducing heat gain for an all season performance. This is visible from the EBR of indigenous architecture of Northern Ghana. In this zone, the mechanism of outdoor living under shade and in the courtyards and on flat roof terraces for cooling complements the heavy and compact composition of enclosed spaces for warmth on extremely cold nights⁹². This is supported by the integrated idea of day time and night time living as suggested by technical design notes for building design in this part of the tropics⁹³. Although Bond does not specifically make references to these technical design manuals in any text⁹⁴, his response recalls the strategy of alternate use of space in vernacular settings for achieving comfort between seasons. The Library, however, integrates this dual requirement in a single composition.

Three concepts made this possible. First, instead of adapting a design concept that employs both light construction⁹⁵ and heavy construction⁹⁶, Bond's approach prioritised a heavy construction. The compact form is reminiscent of the indigenous architectural practices in Northern Ghana.

Second, Bond introduced ventilation mechanisms to complement the compact composition. The buildings prominent North-East and South-West orientation maximises especially the flow of cool South-West Monsoon winds responsible for the rains and high humidity conditions of the rainy season. The Library's four individual buildings – the adults' section, the children's section, the lecture hall, and the staff area are connected by two open but roofed spaces in an open plan configuration. The first open space serves as the anchor to the public lecture hall, and the second is the Library commons, used for exhibitions, issuing cards, and filing. These intermediate spaces, opening externally on three sides, act as ventilation corridors for the adjoining buildings (see figure 4). These openings serve as unhindered inlets for cool South-West Monsoon winds, or outlets for displaced stale air⁹⁷. The hot dry North-East trade winds blowing from the Sahara desert during the dry season were not prioritised for internal ventilation. Inlet spaces do not open in this direction. This reinforces the buildings overall compact nature. Thus, external window openings are limited on façades and designed with minimum sizes to reduce internal heat gain. Consequently, “the major spaces have a minimum number of windows opening to the outside”⁹⁸. The limited openings allow for natural lighting and potentially act as outlets or inlets for ventilation purposes. This compensates for the contrasting conditions of high humidity and small diurnal temperature ranges during the rainy season that warrant a light construction.

Third, the building's overall layout was conceived to reduce heat gain through adequate shading⁹⁹. Bond was particular about shade. The Library, used during the day, required appropriating the outdoor living under shade of vernacular settings, to indoors. Hence, the overarching umbrella roof was conceived to provide shade. The roof rests on free standing columns that extend above the four individual buildings. In addition, the roof provided shade for the open-air storytelling theatre as well as the parking and delivery bay (see figure 5). This strategy met the specific client demand to reduce excessive glare. The umbrella roof performs a dual function. It keeps the entire building in shade throughout the day, thereby reducing the heat gain: it also allows for ventilation of the roof cavity,

dispelling displaced stale air by the stack effect. “Very comfortable temperatures resulted from this arrangement and a breeze flows naturally through the court spaces”¹⁰⁰.

Bond’s distinct response to the local climate, influenced by vernacular practices, recalls Le Corbusier’s approach to practice in general and especially in the tropical world¹⁰¹, as well as the climate related developmental planning strategies of Drew and Fry. The peculiarity of the indigenous architecture of the Frafra, as an outcome of the relationship between the local weather conditions and human comfort, are profoundly conveyed in Bond’s concrete modernism.

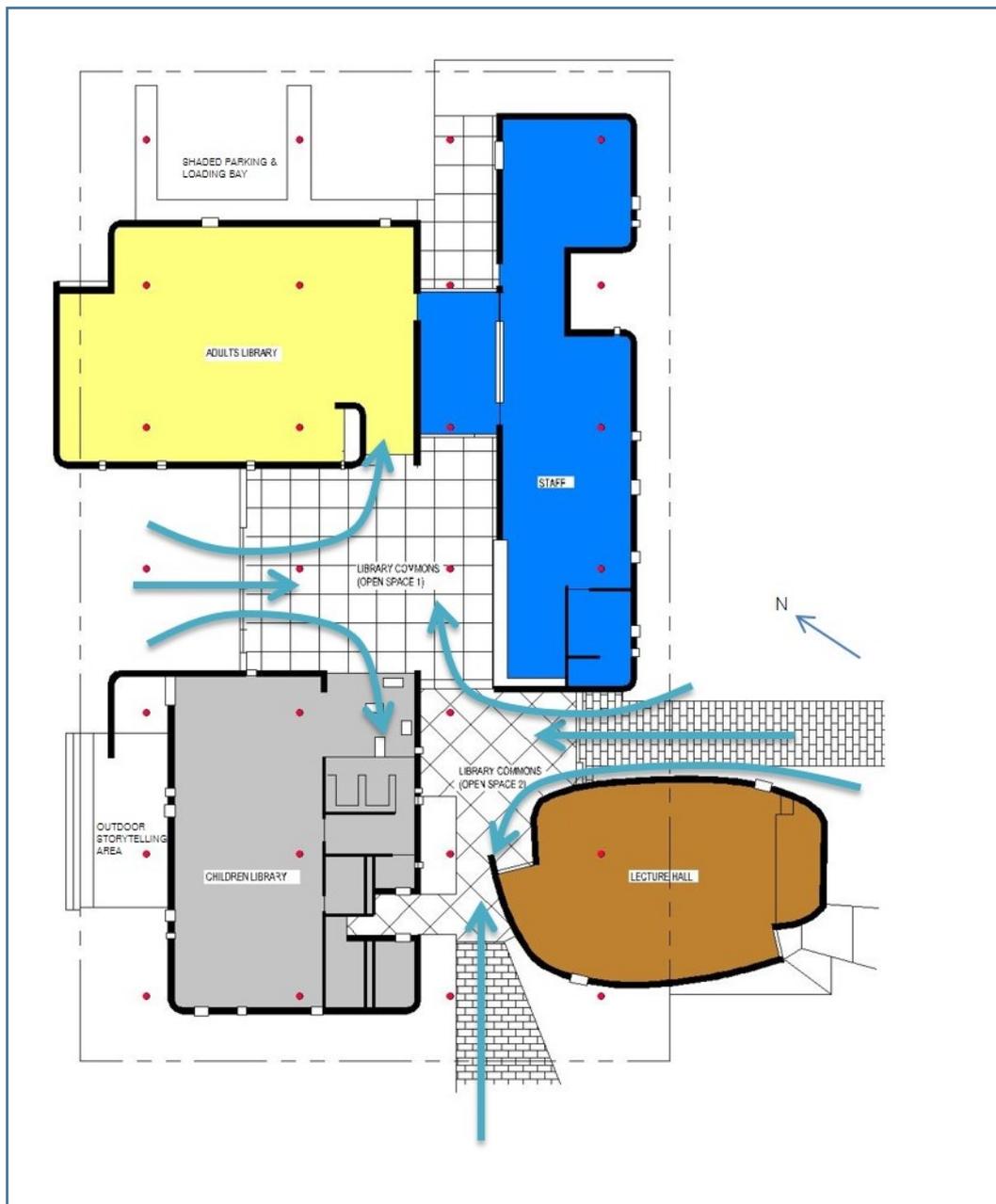


Figure 4. Compositional analysis of Bond's Library and its relationship to weather, highlighting the four buildings separated by the open spaces as well as the outdoor storytelling area and the sheltered parking and loading and off-loading bay.



Figure 5. Left: view of the shaded parking and loading bay. Right: view of shaded storytelling area (with stepped seats).

The experiential and ideological implications

Bond was quite accustomed to the social and experiential inclination of placeness upon his arrival. He understood that the degree of reception for emerging forms of architecture by indigenes is also associated with the psychological mediation of spaces and the appropriation of existing forms. Conscious of this at first hand, Bond sought to symbolically express tradition through compositional depth. His output recalls the solid mass fabrication of vernacular architecture in Northern Ghana, despite the use of concrete. It also recalls Robinson's dynamic proportioning of masses and volumes, and of Le Corbusier's "clean functional"¹⁰² and sculptural¹⁰³ reflections. Bond related to tradition through mimicking the compositional culture of the Frafra house by planning and visual cognition. The four separated buildings of the Library, linked up by two open spaces and united by the umbrella

roof, are reminiscent of the spatial composition of the Frafra house with its interlinked individual rooms laced around an open to sky courtyard or series of courtyards depending on the family structure. Bond recalls the vernacular through the exaggerated base and tapering walls, especially of the lecture hall. Fluid rounded ends as well as the hybrid interlacing of round and rectangular forms all echo the vernacular (see figure 6). The prominence of a solid wall mass when approaching on all sides, instead of generous transparency, gives it the specific character of domestic Frafra architecture (see figure 7). Bond recounted how, on a visit to the project, a little school boy walked up to his group and said, “the house is nice ooh” as the Library appealed to his senses in those terms¹⁰⁴.



Figure 6. Left: view from the open space next to the lecture hall, revealing Bond’s play with regular and curvilinear forms as well as the overarching umbrella roof. Right: the main approach, highlighting the limited presence of windows on the solid mass façade.

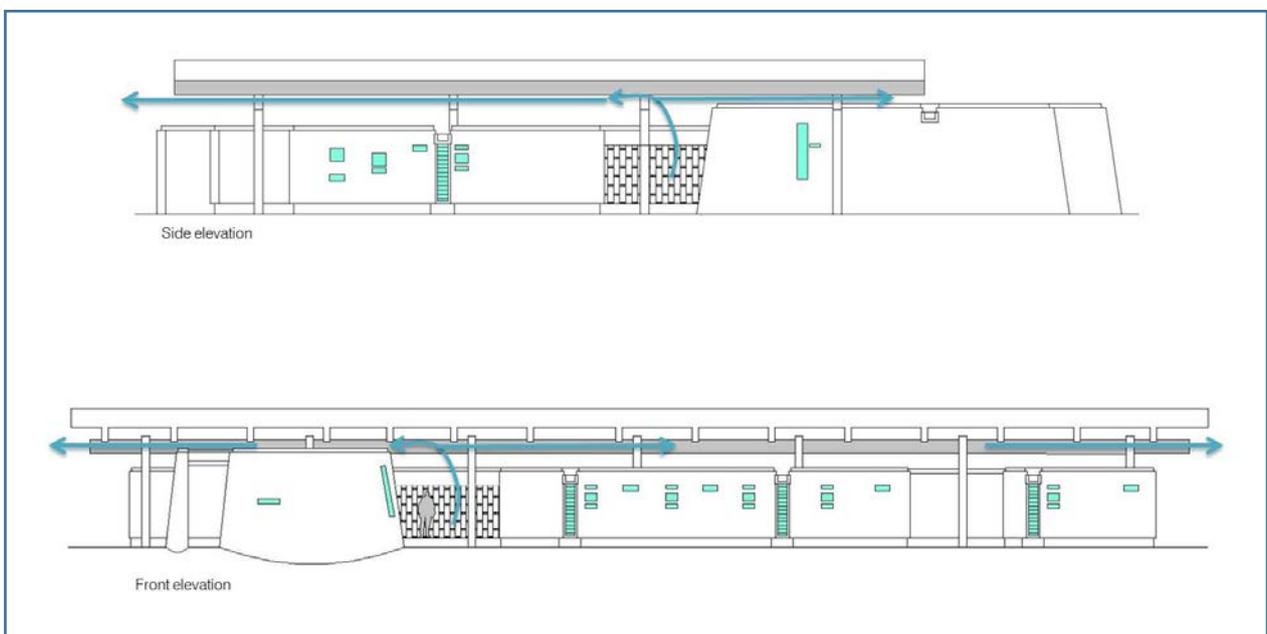


Figure 7. Appropriation of solid masses on façades; shade through umbrella roof vis-à-vis air circulation space between the underside of the umbrella and the tops of the four buildings.

Conclusion

Bond's hybrid experiences shaped his interest in mediated practices, which is brought to bear in an underprivileged community where he created a strong sense of mediating, hybrid modernism. Bond achieves this through the appropriation of Northern Ghanaian vernacular building culture and weather, and the principles of Western modernism as a manifestation of the ideological and experiential approaches to modernist regionalism. His sense of modernism evokes the context of late tropical interventions pioneered in Ghana at the time of his arrival. Further, it is a reflection upon the work of his mentors, especially of Le Corbusier and Robinson. The Library can thus be described as the exploration of the in-between spaces of modernism and vernacular knowledge. The particularisation of modernism in this sense makes the reading of the Library architecture inconclusive on a purely modernist or vernacular level; instead, it can be read on a hybrid and postcolonial level.

The significance of Bond's Library intervention is therefore twofold. Firstly, the distinct response to the local climate in the context of other climate related tropical interventions at the time, represents a crucial moment for rethinking architectural practice in Ghana's hot dry climate today. Secondly, Bond's attempt to replicate the vernacular beyond the knowledge of climate indicates the inherently distinct approach to concrete modernism that questions the place of modernist practices in British West Africa as a parallel to indigenous practices.

Notes

¹ The marginalised is used in a contextual sense for juxtaposing the two poles that shape postcolonial discourse.

² The ideological approach as suggested by Eleftherios Pavlides, is reflected in opportunistic studies on the vernacular that seek to establish elements that confirm modernist ideological positions. They focus on environmental elements that are typical and unique, especially elements that mediate the climate, or the rhythms of massing (See: Eleftherios Pavlides, "Four approaches to regionalism in architecture," In *Architectural regionalism: Collected writings on place, identity, modernity, and tradition*, eds. Vincent Canizaro (New York: Princeton Architectural Press, 2007), 156-167).

³ The experiential approach, like the ideological approach, is based on the architect's estimation of the experiential qualities of the vernacular, but from a more detailed study. The approach conveys the experiential value of the vernacular through visual, social, textual, and decorative effects as well as general approaches to wellbeing for their repetitiveness or primary nature, to the contemporary (Pavlides, "Four Approaches to Regionalism in Architecture," 163).

⁴ At independence in 1957, Nkrumah, Ghana's first President (1957-1966), embraced this literacy interest and considered it a matter of necessity. Nkrumah's efforts through the Ghana Library Board witnessed the design and construction of the Bolgatanga Regional Library. The Library has had an enormous social impact on the community since its completion and use.

⁵ Charles Henry Rowell, "Dedication to the Memory of J. Max Bond, Jr." *Callaloo* 38, no. 4 (2015): xiii-xviii.

⁶ Max Bond, "A library for Bolgatanga," in J. Max Bond, Jr. papers, 1955-2009; Box 25:5, Professional Papers, clippings, various projects, 1960s-1970s, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1968).

⁷ Ola Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On," in *The Challenge of Change: Dealing with the Legacy of the Modern Movement*—(Proceedings of the 10th International DOCOMOMO Conference, 2008), 268.

⁸ Art in America, "Max Bond, Regional Library, Bolgatanga, Ghana, 1967," *Art in America (September- October, 1970)*: 67-67, in J. Max Bond, Jr. papers, 1955-2009, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University; Duke Lynne, Blueprint of a life, architect Max Bond Jr. has begun to build bridges to reach ground zero, *Washington Post*, July 1, 2004.

⁹ Bond, "A library for Bolgatanga"; Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On."

¹⁰ Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On."

¹¹ Hannah Le Roux, "Modern architecture in post-colonial Ghana and Nigeria," *Architectural History* 47 (2004): 389.

¹² KNUST refers to the Kwame Nkrumah University of Science and Technology in Kumasi Ghana, where Bond taught at the School of Architecture.

¹³ Le Roux, "Modern architecture in post-colonial Ghana and Nigeria." We observe however, that Bond designed the Library in 1965 at the GNCC prior to joining the KNUST School.

¹⁴ Bond, "A library for Bolgatanga."

¹⁵ Bond, "A library for Bolgatanga."

¹⁶ Gutschow uses the term "hybrid" modernism to denote- an approach neutral to both its historicized colonial nature and its radically indigenous form. See: Kai Gutschow, "Das Neue Afrika: Ernst May «s 1947 Kampala Plan as Cultural Programme." *Colonial Architecture and Urbanism in Africa: Intertwined and Contested Histories* (2009), p239.

¹⁷ Christiana Kwei and The Ghana Library Board, "Library architecture", in *The Ghana Library Board: Silver jubilee (1950-1975)* (Select publications and promotions/ Arakan Press Ltd, 1975): 81-84.

¹⁸ Jane Drew and Maxwell Fry, *Tropical architecture in the dry and humid zones* (Batsford, 1964).

¹⁹ Harold Holdsworth, "Library buildings in newly developing countries," (1959), retrieved from <https://www.ideals.illinois.edu/bitstream/handle/2142/5881/library..?Sequence=1>.

²⁰ It was the first Regional Library in Ghana to be completed in 1954.

²¹ Holdsworth, "Library buildings in newly developing countries," 285; Kwei and The Ghana Library Board, "Library architecture", 81.

²² Kwei and The Ghana Library Board, "Library architecture".

²³ The present premise was officially opened in 1956, with expansion works to accommodate the exhibition halls and the children's Library completed and commissioned in 1961. Nickson, Borys and Partners designed the Library and its extensions.

²⁴ Roger Williams, *The Bonds: An American family* (New York: Atheneum, 1972).

²⁵ The prominent Afro-American who worked as Chief Designer in the office of Horace Trumbauer and was responsible for a host of projects including the Philadelphia Museum and the Duke University Chapel. He was consumed by classical practice, having studied at the Ecole des Beaux Arts after graduating from the University of Pennsylvania, School of Architecture as the first African-American. He would design anything classical even if the client demanded otherwise.

²⁶ Noted for his influential works in public housing within black communities. He was at the centre of the passage of the first National Housing Act. Robinson understood architecture as a reflection of function and contemporary culture. Amongst his collection of works, the Langston Terrace housing caught the attention of Lewis Mumford. This project is a

recollection of Robinson's view of modernism and the important role of social upliftment of living conditions within the framework of contemporary practice.

²⁷ First black person admitted into the American Institute of Architects in 1921, Fellow in 1923, and posthumously awarded the prestigious AIA Gold Medal in 2017. He is the most famous of Afro-American Architects, known for his eclectic creativity.

²⁸ Max Bond, "Still Here: Three Architects of Afro-America—Julian Francis Abele, Hilyard Robinson, and Paul R. Williams," *Harvard Design Magazine* (1997): 48-53.

²⁹ Bond, "Still Here: Three Architects of Afro-America", 50.

³⁰ Bond, "Still Here: Three Architects of Afro-America.

³¹ Rowell, "Dedication to the Memory of J. Max Bond, Jr."

³² André Wogenscky, *Le Corbusier's hands* (Mit Press, 2006).

³³ Wogenscky, *Le Corbusier's hands*, 51.

³⁴ Wogenscky, *Le Corbusier's hands*, 37; Le Corbusier and Riichi Miyake, *Le poème de l'angle droit* (Fondation Le Corbusier, 1989): A.1.

³⁵ Max Bond, "Resume," in J. Max Bond, Jr. papers, 1955-2009; Box 15:5, Professional Papers, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, undated.

³⁶ Friends including John Henry Clarke and Tom Felings influenced Bond's interest in Ghana.

³⁷ Max Bond, "Lecture, Ghana Talk," in J. Max Bond, Jr. papers, 1955-2009; Box 11:14, professional papers, Resume & career Bios, ca 1990s, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, NYU, (2005).

³⁸ Max Bond, "Resume & career bios.," in J. Max Bond, Jr. papers, 1955-2009; Box 15:6, professional papers, Resume & career Bios, ca 1990s, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1990).

³⁹ Bond's designs at the Flagstaff House include the zoo, the broadcast studio, combined meeting rooms as well as quarters for guards.

⁴⁰ Łukasz Stanek, "Architects from Socialist Countries in Ghana (1957–67): Modern Architecture and Mondialisation." *Journal of the Society of Architectural Historians* 74, no. 4 (2015): 416-442.

⁴¹ During Bond's time in Ghana, the Gold Coast Society of Architects (GCSA) (founded 1954) of mainly British Architects existed as a separate entity to the Ghana Institute of Architects (GIA) (founded in 1962). Members of the Gold Coast Society of Architects were mainly engaged in private practices. In 1965 these societies merged. The Ghana Institute of Architects had practitioners from Socialist East and indigenous Ghanaian Architects, most of whom worked for the government at either the Ghana National Construction Company (GNCC) or Public Works Department (PWD), as its

members. Lukasz Stanek observes that discernible rivalry existed between the two networks largely because British architects in Ghana saw their counterparts' foothold on architectural commissions by Nkrumah's government as a serious threat. Bond was a member of the Ghana Institute of Architects and worked for the GNCC. See Stanek, "Architects from Socialist Countries in Ghana (1957-1967)"; also refer to: Ghana Institute of Architects, "Minutes of the general meeting of the Ghana institute of architects, September 29, 1964," in J. Max Bond, Jr. papers, 1955-2009; Box 26:9, professional papers, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University.

⁴² Ghana Institute of Architects, "Minutes of the general meeting of the Ghana institute of architects, September 29, 1964."

⁴³ Stanek, "Architects from Socialist Countries in Ghana (1957-67)."

⁴⁴ The Ghana National Construction Company with Mr. Allotey as the Regional Manager, and Mr. Hagan as Site Foreman constructed the Project. The Project was initially estimated to cost 140,000 dollars. Bond had Mr. Nat Cofie as his Chief Draftsman for this Project. See: Bond, "Lecture, Ghana Talk."

⁴⁵ Stanek, "Architects from Socialist Countries in Ghana (1957-67)," 431.

⁴⁶ Hannah Le Roux, "The networks of tropical architecture," *The Journal of Architecture*, 8, no. 3 (2003): 337-354.

⁴⁷ Tom Avermaete, *Another Modern: The post-war architecture and urbanism of Candilis-Josic-Woods* (NAi Publishers, 2005).

⁴⁸ Liane Lefaivre and Alexander Tzonis, "The suppression and rethinking of regionalism and tropicalism after 1945," *Tropical Architecture: Critical regionalism in the age of globalization* (Londres: Wiley, 2001).

⁴⁹ Iain Jackson and Rexford Assasie Oppong, "The planning of late colonial village housing in the tropics: Tema Manhean, Ghana," *Planning Perspectives* 29, no. 4 (2014): 475-499.

⁵⁰ Rhodri Windsor Liscombe, "Modernism in Late Imperial British West Africa: The Work of Maxwell Fry and Jane Drew, 1946-56," *Journal of the Society of Architectural Historians* 65, no. 2 (2006): 188-215.

⁵¹ Iain Jackson and Jessica Holland, *The Architecture of Edwin Maxwell Fry and Jane Drew: Twentieth Century Architecture, Pioneer Modernism and the Tropics* (Routledge, 2016).

⁵² Liscombe, "Modernism in Late Imperial British West Africa: The Work of Maxwell Fry and Jane Drew, 1946-56," 194

⁵³ Bond, "Lecture, Ghana Talk," point 6.

⁵⁴ In a personal communication with John Owusu Addo, the first Ghanaian Head of School at the KNUST Architecture Department, and Bond's colleague, indicates Bond designed the Library directly as a commission by the Ghanaian government through the Ghana Libraries Board at the GNCC in 1964. Supervision of the project was during his time at the Department from 1965.

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- ⁵⁵ KNUST-School of Architecture, "Banda Nkwanta study," in J. Max Bond, Jr. papers, 1955-2009; Box 25:23, Faculty papers. Kwame Nkrumah University of Science and Technology, Kumasi, 1966, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1966).
- ⁵⁶ KNUST-School of Architecture, "Draft syllabus," in J. Max Bond, Jr. papers, 1955-2009; Box 5:22, Faculty Papers, Kwame Nkrumah University of Science and technology, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1967).
- ⁵⁷ KNUST-School of Architecture, "Pamphlet contribution to the international union of architects conference on architectural education," in J. Max Bond, Jr. papers, 1955-2009; Box 5:22, Faculty papers. Kwame Nkrumah University of Science and Technology, Kumasi, 1967, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1965).
- ⁵⁸ Thomas Dutton, "Architectural education and society: An interview with J. Max Bond, Jr, *Voices in Architectural Education. Cultural Politics and Pedagogy*" (New York: Bergin and Garvey, 1991).
- ⁵⁹ Bond, "Lecture, Ghana Talk," point 8.
- ⁶⁰ Max Bond, "Draft presentation at the slave routes, the long memory conference in New York," in J. Max Bond, Jr. papers, 1955-2009; Box 11:14, Professional Papers, Lecture, NYU, 1999, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University (1999).
- ⁶¹ Bond, "Still Here: Three Architects of Afro-America."
- ⁶² Max Bond, "Collaborating with minority architects," in W. S. Saunders & P. G. Rowe (Eds.), *Reflections on architectural practices in the nineties* (New York: Princeton Architectural Press, 1996), 160-165.
- ⁶³ Dutton, "Architectural education and society", 85.
- ⁶⁴ Paul Ricoeur, "Universal civilisation and national culture", in *Architectural regionalism: Collected writings on place, identity, modernity and traditions* (New York: Princeton Architectural Press, 2007), 42-55.
- ⁶⁵ Bond, "Draft presentation at the slave routes," para.1.
- ⁶⁶ Bond, "Still Here: Three Architects of Afro-America", 53.
- ⁶⁷ We relate to Jonathan Hill's position on weather and architecture as a dual discourse of climate and climatically inflicted socio-cultures, to say the discourse on climate related modernism, especially of late tropical practices, reflects more on the discourse of the weather. Climate seems a more technically focused element. Placing climate at the center of modernist discourse in former colonies reinforces the binary whereas the weather brings up the reciprocity of influences with a growing focus on the social culture.
- ⁶⁸ Jonathan Hill, *Weather architecture* (Routledge, 2013).
- ⁶⁹ Le Corbusier's reflection on the rising and setting sun and its control over human activity echo the idea of the weather and architecture. See: Le Corbusier and Anthony Eardley, *The Athens Charter* (New York: Grossman Publishers, 1973).

⁷⁰ This concern had earlier shaped Fry and Drew's revisions to their books from a focus on the humid zone to a contextualization of the dry and humid zones.

⁷¹ Liscombe, "Modernism in Late Imperial British West Africa: The Work of Maxwell Fry and Jane Drew, 1946-56."

⁷² Bond Max, "Draft lecture, architecture and architectural practice in Africa and America," in J. Max Bond, Jr. papers, 1955-2009; Box 11:08, Professional Papers, lecture, 1995, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (1995): para. 4-5.

⁷³ Bond, "Architectural education and society," 87.

⁷⁴ Bond, "Architectural education and society."

⁷⁵ Bond, "Architectural education and society."

⁷⁶ Patrick Wakely and Khamil Mumtaz, "Community building in the Upper Region of Ghana," *Arena: Architectural Association Journal. Arena/Interbuild*, 82, no.904 (1996): 58-60.

⁷⁷ Bond Max, "Letter from J. Max Bond Jr. to his parents," in J. Max Bond, Jr. papers, 1955-2009; Box 26:5, Personal Papers, correspondence, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University, (March 28, 1966): para.4.

⁷⁸ Bond, "Lecture, Ghana Talk," point 8.

⁷⁹ Bond, "Letter from J. Max Bond Jr. to his parents."

⁸⁰ Fred Agyemang and The Ghana Library Board, *The Ghana library board: Silver jubilee (1950-1975)* (Select publications and promotions/ Arakan Press Ltd, 1975).

⁸¹ Bond does this by relating to seasons and the lifestyle of the people and how it shapes building forms and strategies in that part of Ghana.

⁸² Bond Max, "Project Records, Bolgatanga Library, Article written by Max Bond," in J. Max Bond, Jr. papers, 1955-2009; Box 17:5, Personal Papers, correspondence, Department of Drawings & Archives, Avery Architectural and Fine Arts Library, Columbia University: 68, para. 8.

⁸³ Bond, "A library for Bolgatanga," Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On."

⁸⁴ As the architecture of sub-Saharan Africa has mostly been domestic in character, situating placeness in postcolonial architectures in the form of a library, the office block and others may be confined to the appropriation and integration of the Environmental Behaviour Relations of the vernacular as well as the abstraction of the visual and tactile forms within contemporary building design systems.

⁸⁵ This involves a study of cultural group characteristics over a short or long term demarcating how these characteristics determine constant and variable expressions in architecture. See: Amos Rapoport, "Vernacular design as a model system," in *L. Asquith and M. Vellinga (ed. s), Vernacular Architecture in the Twenty-First Century (Theory, Education, and Practice)*, (Taylor and Francis, London, UK, 2006): 179-198.

⁸⁶ Pavlides, "Four approaches to regionalism in architecture."

⁸⁷ Bond, "A library for Bolgatanga," 66, para 2.

⁸⁸ The courtyards are utility spaces for a number of functions including drying, cooking, and night time outdoor sleeping in the rainy season. The courtyards also offer security and privacy.

⁸⁹ Labelle Prussin, *Architecture in northern Ghana* (University of California Press, 1969).

⁹⁰ Bond, "A library for Bolgatanga," 66, para 1.

⁹¹ Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On."

⁹² Prussin, *Architecture in northern Ghana*.

⁹³ See publications by: Alfred Alcock and Helga Richards, *How to build for climate* (London: Longmans, Green and Company, 1960); Commonwealth Experimental Building Station, *Notes on the science of building- design for climate*, Chatswood, N.S.W., Dept. of Works and Housing, No. SB1, (1949); Commonwealth Experimental Building Station, *Notes on the science of building; thermal insulation*, Chatswood, N.S.W., Dept. of Works and Housing, No. SB 25, (1952); Jane Drew, Maxwell Fry and Harry Ford, *Village Housing in the Tropics: with special reference to West Africa* (Routledge, 2013).

⁹⁴ This is, with the exception of his draft lecture on architecture and practice in Africa and American, where Bond advances the idea of climate and weather in the hot and humid zones "Draft lecture, architecture and architectural practice in Africa and America."

⁹⁵ This works best during the rainy season when diurnal temperature ranges are low and humidity is high.

⁹⁶ The harsh and large diurnal temperature variations of the dry season requires a heavy construction.

⁹⁷ Bond, "A library for Bolgatanga."

⁹⁸ Bond, "A library for Bolgatanga," 69, para. 10

⁹⁹ Lynne Duke, "Blueprint of a life, Architect Max Bond Jr. has begun to build bridges to reach ground zero," Washington Post, July 1, 2004, <http://www.washingtonpost.com/wp-dyn/articles/A19414-2004Jun30.html?noredirect=on>.

¹⁰⁰ Bond, "A library for Bolgatanga," 68, para. 9.

¹⁰¹ Uduku, "Bolgatanga Library, Adaptive Modernism in Ghana 40 Years On."

¹⁰² Art in America, "Max Bond Regional library, Bolgatanga, Ghana, 1967," 67.

¹⁰³ There is a trace of Le Corbusier's fluid sculptural compositions typical of his later works, especially with the form of the lecture theatre and overall rounded ends of the Library.

¹⁰⁴ Bond, "A library for Bolgatanga," 69, para. 14.