An Identity in Concrete:

How a material shaped national and individual, built and imagined realities in India

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Introduction

"… concrete has a metaphysics as well as a physics, an existence in the mind parallel to its existence in the world."[1]

- Adrian Forty, *Concrete and Culture*, 2012

Despite origins in early Roman construction practices, concrete has continued to capture imaginations over time and across borders. Normative discussions on concrete have often revolved around its structural and aesthetic properties, however, this material has been re-adapted under very different social parameters within the 'Global South', specifically India. This thesis traces how institutional practices employing concrete managed to weave this material into the Indian social, cultural, and economic fabric, establishing its physical and emotional omnipresence. Explored through the materiality and domestic consumption of concrete, it illustrates how concrete was utilized as currency by both institutional and individual agents to accrue financial capital, social status, and emotional security. This thesis further details the strategies employed by national institutions such as the Public Works Department and private cement companies such as the Concrete Association of India, the Associated Cement Companies Ltd., and the Cement Manufacturing Company to market concrete as a commodity exemplifying the "modern". Explored through the materiality and domestic consumption of concrete, it illustrates how concrete has morphed to take on distinct "situated" meanings in the Indian imagination. Beyond an architectural history of the built environment it has shaped, this thesis

[1] Adrian Forty, *Concrete and Culture: A Material History* (London: Reaktion Books, Limited, 2012), 8.

examines in part the phenomenological experiences elicited by concrete, and by extension the concrete home, within systems of production and consumption.

Growing up in semi-urban and urban India, I have witnessed concrete alter my surrounding landscapes unparalleled to any other material. This thesis emerged out of personal questions and observations about the connotations linked to concrete within Indian construction practices and the production of the "ideal" concrete home. A significant amount of my upbringing was split between a concrete home (my parents') and a traditional home - a combination of a vernacular pitched roof and earthen construction (my grandmother's). Both these homes evoked different lived experiences and emotional responses. Built in the early decades of the twentieth century, my grandmother's home was eventually demolished to be replaced by this ideal concrete home. One of many examples, this was a sequence of events that was becoming an increasingly common and familiar sight in the Indian built landscape. Initial retrospection about the motivations behind this very driven choice to own a concrete home pointed to further questions of class, lifestyle, security, and ambition enmeshed within the notions of Indian domesticity and materiality. This thesis is eventually a culmination of these preliminary personal impressions and continued research which echoed larger regional sentiments that warranted further elaboration.

Given the expansive scope linked to a material such as concrete, the questions that this thesis attempts to answer can be divided into two main categories. First, to identify the key agents and constituents that formed a political and socio-economic ecosystem that cultivated the production and use of concrete. This thesis traces how colonial and twentieth century institutional practices created a unique environment that advocated for the embrace of this material by consumers of varying aspirations and class. Second, to construct the multivalent

meanings associated with concrete as a material within Indian construction practices. Why did and does the Indian homeowner consciously choose to let go of the traditional home to inhabit a concrete one? Does the identity of its inhabitants change with the shifting built environment? This thesis looks at identifying the economic and societal values that have been imbibed into the Indian concrete home over time; these values, which are both regionally distinct yet seem to have a reverberating global sentiment across other cultural landscapes.

Concrete

Modern concrete is a mixture of cement, water, sand, and aggregates. Cement, a limestone-based composite activated by the addition of water serves as the primary binding agent for the multiple components. Developed in England in the early nineteenth century, Portland cement is now the most widely used type of cement in concrete mixtures. The ratios of the multiple components that go into the making of concrete vary based on its intended usage and durability. The global embrace of concrete can in part be attributed to its complicated historic origins across time and place. Architectural historian Adrian Forty, argues that concrete is an "anti-historical" material and that this very attribute has lent concrete the ability to continuously reinvent its very meanings and definitions.[2] Further allowing it to be a medium that has been temporally suspended, with the potential of belonging to the future instead of the past.

While the earliest uses of concrete have been attributed to the Roman usage of pozzolana (a naturally occurring binding agent), it saw a resurgence in the early nineteenth century with increased experimentation using metal reinforcements. Prominent of these in most recounts are Joseph Lambot's reinforced boat and Joseph Monier's patent for flowerpots reinforced with iron

[2] Adrian Forty, "Myths of the Origins of Concrete", in *Founding Myths: gta papers*, Laurent Stadler, Tom Avermaete, Maarten Delbeke, Philip Ursprung, and Ita Heinze-Greenberg, eds. (Zurich: gta Verlag, 2019), 69 – 77.

meshes.[3] Alongside this are notable experiments and patents by English engineer James Wilkinson and Americans William Ward and Thaddeus Hyatt. These names are only a few of a diverse cast of engineers, entrepreneurs, and experimenters of this period that made varying improvements to concrete construction practices. Due in part to its complexity of assembly on site, in comparison to other building materials, the use of reinforced concrete in buildings evolved into a competitive system of patenting. Belgian contractor Francois Hennebique's 1892 patent soon became the most widely used patenting system, aided by a highly proactive marketing campaign.[4] This system implied that whether a client hired an architect or a contractor, the use for the patented system had to be purchased. This included the structural design, the license for the materials, and instructions on building that patented system. This ended up placing high emphasis on the "scientific" manufacturing of concrete and completely overshadowed the aspect of its manual labor on site. As Forty argues, the history of modern concrete "expands or contracts" based on the narrating party's allegiance, nationality, or interests.[5] When defining concrete, it then becomes hard to pinpoint in which feature or patent its originality lies, further mythicizing its very nature. [6]

Historiography and Theoretical Frameworks

Architectural historian Peter Collins', 1959 book *Concrete: The Vision of a New Architecture,* is one the earliest books to discuss and spotlight concrete as a material in architectural practice.[7] In the first half of the book Collins provides detailed accounts of the

[3] Forty, "Myths of the Origins of Concrete", 69 – 77.
[4] Forty, "Myths of the Origins of Concrete", 71.
[5] Forty, "Myths of the Origins of Concrete", 71.
[6] Peter Collins, *Concrete: The Vision of a New Architecture: A Study of Auguste Perret and His Precursors* (New York: Horizon Press, 1959), 38.
[7] Collins, *Concrete: The Vision of a New Architecture.*

multiple patents that were registered by architects and engineers in France, England, America, Germany, and Australia and the intermittent or long-standing successes they achieved.[8] The second half of Collins' book is a dedicated biography exploring the life and work of French architect Auguste Perret, who, in Collins' view, was one of the most successful entrepreneurs building with concrete.[9] Collins' book, if anything, provides an introduction and proves useful to familiarize oneself with the early technical experiments with concrete construction in the West and the extensive and multivalent history associated with its technical "invention". However, its geographical scope is limited, as its narrow focus on the works of one European architect tells a delineated history of concrete.

Published nearly 50 years later, Adrian Forty's 2012 book, *Concrete and Culture* attempts to capture the more ambiguous and entrepreneurial nature of concrete and its expression in the built landscape.[10] Forty calls upon his readers to look at concrete as a *medium* rather than just a material – a medium of communication and change.[11] *Concrete and Culture* tackles these intertwined histories of concrete as a medium; discussed through the themes of modernity, geopolitics, memory, labor, visual media and the most significant - architecture.[12] Forty's approach leaves us with a material history of concrete that transcends a normative focus on building technologies and architectural styles. Nevertheless, the physical and metaphysical questions about concrete explored in this text lay the foundation for this thesis and form an important underlying theoretical framework.

[8] Collins, *Concrete: The Vision of a New Architecture.*
[9] Collins, *Concrete: The Vision of a New Architecture.*
[10] Adrian Forty, *Concrete and Culture: A Material History* (London: Reaktion Books, Limited, 2012).
[11] Forty, *Concrete and Culture*, 10.
[12] Forty, *Concrete and Culture*.

However, while it attempts to be global in its approach, Forty's discussion still falls short of the more contemporary meanings concrete has taken on within less prominent building practices and in the Global South. Mediums take on explicit meanings under colonial and post-colonial systems and societies. They accrue distinct social parameters and mobility.[13] This thesis draws on post-colonial frameworks of architectural discourse from Vikramaditya Prakash, Maristella Casciato, and Daniel Coslett's, *Rethinking Global Modernism: Architectural Historiography and the Postcolonial* to understand the global architectural networks of 'modern' institutional systems.[14] To draw on a more situated reading of concrete in post-colonial landscapes author David Morton's 2019 book, *Age of Concrete: Housing and the Shape of Aspiration in the Capital of Mozambique* has proved incredibly valuable.[15] Morton charts the complex history of housing in Maputo, the capital of Mozambique and the role of concrete in shaping the city's spatial and socio-economic structures of hierarchy. Morton draws from a rich collection of oral history interviews with the citizens of Maputo to augment the interlinked associations of concrete as a material and its aspirations of modernity. This thesis draws on Morton's understanding of how individuals and communities stake ownership over their identities and livelihoods through building as a public political act.

On situating the discourse on 'modern' Indian architecture, the collection of essays, *Colonial Modernities: Building, Dwelling and Architecture In British India and Ceylon*, edited by authors Peter Scriver and Vikramaditya Prakash provides an evaluative overview of the

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[13] Arjun Appadurai, ed. *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge: Cambridge University Press, 1986), doi:10.1017/CBO9780511819582.
[14] Vikramaditya Prakash, Casciato, Maristella, and Daniel E. Coslett, "Global Modernism and the Postcolonial", in *Rethinking Global Modernism: Architectural Historiography and the Postcolonial* (1st ed. Routledge. 2021), 3-22.
[15] David Morton, *Age of Concrete: Housing and the Shape of Aspiration In the Capital of Mozambique* (Athens: Ohio University Press, 2019).

architectural history and theory of the Indian subcontinent.[16] Positioned theoretically at the juncture of critical colonial history and cultural studies, it addresses the topic of the 'colonial modern' in Indian architecture through discussions on "frames of discourse", "institutional frameworks", and "domestic frames of practice".[17] The theoretical concept of "institutional frameworks" had been critical to identifying, classifying, and organizing the multiple agencies traced within this thesis. This framework has been adopted and further expanded upon in this thesis, to also include post-colonial and native constituents.

Another key text that has informed the historiographic grounding of this topic has been authors' Peter Scriver and Amit Srivastava's seminal text, *India: Modern Architectures in History*.[18] In this book, Scriver and Srivastava attempt to curate a longer critical history of modernity amidst the rapidly changing architectural ideals and building traditions of India.[19] The book charts the shifts in architectural practices in India from the 1850's to the 1990's, encompassing the height of its British colonial occupation to a nation poised at crafting its own identity. This text has significantly informed this thesis in terms of the overlap in its temporal scope of discussion. It has also helped build and elaborate on the themes of rationalization, institution building, and nation building in the first chapter of this thesis.[20]

On Indian consumption practices within domestic spaces, Abigail McGowan's work is uniquely situated to understand the intersection of mass production of goods and visual marketing strategies. Both essays, "Consuming the home: Creating consumers for the middle-class house in India, 1920-60" and "The Materials of Home: Studying Domesticity in Late

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[16] Peter Scriver and Vikramaditya Prakash, *Colonial Modernities: Building, Dwelling and Architecture In British India and Ceylon* (London: Routledge, 2007).
[17] Scriver and Prakash, *Colonial Modernities*, 14.
[18] Peter Scriver and Amit Srivastava, *India: Modern Architectures in History* (Reaktion Books, Limited, 2016).
[19] Scriver and Srivastava, *India: Modern Architectures in History.*
[20] Scriver and Srivastava, *India: Modern Architectures in History.*

Colonial India" have been helpful to this thesis in utilizing and critically reading primary evidence to gain a more nuanced understanding of Indian domestic consumption practices during the twentieth century.[21] Amidst multiple other evidentiary sources utilized by McGowan, this thesis draws from the same collection of journals as a primary pool of evidence. McGowan's essays have partly informed the research methodologies undertaken in this thesis, specifically in the reading of visual culture materials. However, her topic of discussion concerns itself with the history of pattern books and visual media shaping early professional architectural practice in India and the changing domestic spaces and dynamics linked to the production of the Indian home. This thesis distinguishes itself from McGowan's work through its exploration of concrete as the critical central agent through which the Indian home was conceptualized.

The theoretical underpinnings of this thesis are rooted in the phenomenological affectations induced by concrete on its surroundings. To understand concrete as a material and an active agent, a critical approach to material studies forms an equally important part of the historiography of this thesis. Scholarship from Bruno Latour, Pierre Bourdieu, and Gaston Bachelard have greatly contributed to provide the philosophical groundwork to this thesis. Following this, this thesis draws on political theorist, Jane Bennett's framework of *vital materialism* as a critical lens through which to analyze concrete as a medium and a primary constituent. Bennett's 2009 book, *Vibrant Matter* has helped pursue the questions raised by Forty further, by engaging in a more active ontological discourse.[22]

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[21] Abigail McGowan, "Consuming the home. Creating consumers for the middle-class house in India, 1920-60", in *Globalising Everyday Consumption in India* (Routledge. 2020); Abigail McGowan, "The Materials of Home: Studying Domesticity in Late Colonial India", in *The American Historical Review* (Volume 124, Issue 4, October 2019), 1302 -1315.

[22] Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2010).

Materiality

In *Concrete and Culture,* Forty calls to our attention a discerning duality inscribed in the production of concrete – a scientifically progressive and constituted material but also one rooted in human labor, execution, and craftsmanship.[23] While composed of industrially produced factory products such as steel bars and cement, the coming together of concrete on site – from the addition of sand, aggregate, and water to the assemblage of the wooden or metal formwork hewn together - is very much the opposite of a controlled process. It is crafted within an 'assemblage'.[24] In *Vibrant Matter,* Bennett, describes 'assemblages' as ad hoc groupings of diverse vibrant materials.[25] As Bennett states, these assemblages tend to manifest through their emergent properties - emergent in their "ability to make something happen."[26]

Reinforced concrete is an assemblage of concrete and steel. Concrete, an assemblage of cement, sand, water, and a form of aggregate. (Note: reinforced concrete and concrete are used interchangeably in both academic and colloquial contexts). Each of these materials is further made up of their constituent chemical elements. Is concrete then the *thingness* of its parts – cement and steel? [27] Or the further *thingness* of its constituent parts? This thesis attempts to explore these complexities and idiosyncrasies of concrete as a material. Within a built space, reinforced concrete forms the shell to house other materials, and to create a home is to create the ultimate aspirational assemblage for a consumer. The assemblage, due to its complex nature and constituent parts, is almost always in a state of flux.[28] This flux, in the case of concrete, evokes a

[23] Forty, *Concrete and Culture*, 15.
[24] Bennett, *Vibrant Matter*, 23.
[25] For more on the topic of vibrant materialism, see Bennett, *Vibrant Matter.*
[26] Bennett, *Vibrant Matter*, 23.
[27] For more on "thingness", see Bill Brown, *Things* (Chicago: University of Chicago Press, 2004); Martin Heidegger, "The Thing", in *Poetry, Language, Thought* (New York: Harper & Row, 1971).
[28] Bennett, *Vibrant Matter*.

sense of uncertainty, or better yet a sense of *possibility*. Forty compares concrete to the "primitiveness" associated with building with mud.[29] The moment of suspended possibility is made viable due to the fluidity of the concrete pour, much like the ability to shape mud. Does concrete achieve its ambiguity due to its process? Or perhaps its assemblage? This uncertain or undefinable aspect of concrete allows the material to be molded, both literally and figuratively, to take on new meanings by its systems of production *and* consumption. The aim of this thesis is to enrich a historical discussion of concrete construction through the adoption of a framework drawn from vital materialism.

Chapter Overview

The structuring of this thesis draws from Bennett's functional system of the assemblage and the constituents that form it. Chapter one lays the groundwork to orient the reader to the political and socio-economic context of this thesis. A discussion of the architectural practices of present-day India still needs to navigate its intersection with colonial practices of the British Empire who had a marked administrative presence of almost 200 years in the nation. Hence, chapter one begins its discussion with colonial systems of extraction and production and the introduction of contemporary concrete construction within the Indian subcontinent. These systems form the "institutional frameworks" that played a key role in the administrative policies, distribution of resources, and the production and dissemination of concrete that shaped the built environment.

Chapter two marks the pivotal point of Independence and discusses both the shifts away from and the embrace of previous systems. It looks at how the various constituents mentioned in

[29] Forty, *Concrete and Culture*, 33.

the previous chapter come together to create the assemblage of Indian concrete construction practices. This chapter utilizes journal publications as a lens to analyze methods of marketing and consumption of the Indian urban and rural (concrete) home. This chapter looks at not just the assemblage as a whole but also the different ways in which these constituents came together to create a situated ‘modern’ national and individual identity through built and unbuilt architectural gestures.

The concluding chapter serves as expanded conclusion for this thesis and looks at framing both the assemblage and the constituents of concrete construction in India through a critical material culture approach. It is meant to draw on more observational connections that pushes the discussion on concrete into the realm of *vital materialism.* The analysis within this thesis is organized such that it culminates at an autoethnobiographical perspective. With personal observations and lived experiences mediated through concrete as a material offering a lens through which to understand it. A supplemental goal of this thesis is to contribute to the subaltern archive as a record of both academic scholarship and perceived collective memory.

Chapter I: The Constituents

'A Family Home', 194(?) – 2016. Mangalore, India.

(Photograph by author. Not to be reproduced)

In much of the recent scholarship in post-colonial studies, part of the project of decolonization has been to deconstruct the existence of the "West-ern" marker - since the existence of the "West" has been purely supported by the creation and existence of the "Orient".[30] In their introduction to *Rethinking Global Modernism*, authors Prakash, Casciato, and Coslett critique this "self-construction" of the West as the "West". According to the authors, a claim to the "West", accompanies with it the claim over systems such as modernity, rationality, democracy, and so forth, which are often employed as agents of "othering".[31] In the case for modern architecture, it then becomes increasingly difficult for the post-colonies to claim it also as their own, despite native adaptation and reinvention. This framework "reconsiders the agency of the subaltern and the roles played by infrastructures, materials, and global institutions in propagating a diversity of modernisms internationally."[32] This critical reading of modern architecture is intended to recenter it from a colonial-postcolonial reading to a more a situated and contextual one.

To achieve this, it then becomes important to understand how modern architecture is a "shared global inheritance"[33]. Under the auspices of progress and empire, colonies often became sites of material and operational experimentation. Infrastructural, transportation, and communication projects were a means to enable further resource extraction from the colonies. Modernization was birthed just as much in the colonies as it was simultaneously in the West.[34]

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[30] Vikramaditya Prakash, Maristella Casciato, and Daniel E. Coslett, "Global Modernism and the Postcolonial", in *Rethinking Global Modernism: Architectural Historiography and the Postcolonial* (1st ed. Routledge. 2021), 9-11.
[31] Prakash, Casciato, and Coslett, "Global Modernism and the Postcolonial", 9-11.
[32] Prakash, Casciato, and Coslett, "Global Modernism and the Postcolonial", 9-11.
[33] Prakash, Casciato, and Coslett, "Global Modernism and the Postcolonial", 11.
[34] This theorization is further expanded upon later in the chapter. For more on this topic see Chinua Achebe, *Things Fall Apart* (London: Heinemann, 1958); Gayatri Chakravorty Spivak, "Can the subaltern speak?", in Carry Nelson and Larry Grossberg eds., *Marxism and the Interpretation of Culture*, (Macmillan Education: Basingstoke, 1988), 271-313; Dipesh Chakrabarty, *Habitations of Modernity: Essays In the Wake of Subaltern Studies* (Chicago: University of Chicago Press, 2002); Chakrabarty, Dipesh. *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton: Princeton University Press, 2000).

Modernization, both enforced and embraced, brought with it a replacement of indigenous systems of knowledge, but also the ability to exert agency. It became a means by which the post-colonial could be in conversation with the world. This conversation, this back-and-forth, ensured the exchange and transculturation of knowledge and practices. Modernization, and the commodities that were exchanged under systems of modernization, were therefore imbued with value by their nature of motion in global systems.[35] Much like the definition of the "West", the "social use value" of modernization was accrued in conversation with the post-colonial.[36]

This thesis is situated at the onset within post-colonial studies with the aim of contextualizing the subsequent conversations on concrete and 'modernity' in India. Concrete would very well have been a truly global commodity and found its way into Indian construction practices, but the historic reality is that it did so at the height of its British colonial oppression. Concrete became a medium that was 'modern' to both the colonizer and the colonized but with differently imbibed value systems. The inherent tension of these multiple meanings is both rooted in and is an attempt to break away from its colonial antecedents.

"Institutional Frameworks"[37]

The "institutional framework" terminology is drawn from Peter Scriver and Vikramaditya Prakash's work on identifying the "bureaucratic apparatuses" through which the British Empire in India oversaw its administrative duties.[38] This section of the thesis addresses their importance and the impact they had on the production of both the colonial and post-colonial-built

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For more on this topic in the context of Indian architecture see, Peter Scriver and Vikramaditya Prakash, *Colonial Modernities: Building, Dwelling and Architecture In British India and Ceylon* (London: Routledge, 2007); Peter Scriver and Amit Srivastava, *India: Modern Architectures in History* (Reaktion Books, Limited, 2016).

[35] Arjun Appadurai, *The Social Life of Things: Commodities in Cultural Perspective*.

[36] Karl Marx, "A Critical Analysis of Capitalist Production", in *Capital: Vol. I* (Moscow: Progr. Publishers. 1971), 48.

[37] Scriver and Prakash, *Colonial Modernities*, 14.

[38] Scriver and Prakash, *Colonial Modernities*, 14.

environment. The thesis, however, doesn't restrict these institutional frameworks to colonial powers. It instead builds on this definition to identify all the key bureaucratic powers, including native institutions that exerted their agency, specifically on the concrete construction industry of India.

By the 1820's much of what would constitute British India was already brought under its territorial control. However, the Empire's north-eastern regional expansion continued well into the 1880's.[39] Growing territorial control eventually meant increased access to the multiple resources across India. The opening of the Suez Canal in 1869 further accelerated movement across the Empire and facilitated increased military and technological presence within the Indian colony. With its growing industrial and manufacturing power in the nineteenth century, Britain's resource acquisition began to rely heavily on its Indian colony. This image of a later mid-twentieth century poster commissioned during World War II highlights the propaganda that went into justifying British presence in India and its objectification of the Indian colony as a site of abundance and prosperity (Fig.01).[40] At the same time, beyond that, the Empire expanded upon the opportunity to export raw materials and import finished products into a newly realized consumer base.

Founded in 1600, the English East India Company (EIC) was a joint-stock trading company that had obtained exclusive trading rights in the east, which included the Indian sub-continent and south-east Asia.[41] The EIC was originally intended to be a purely mercantile organization, armed with its own military for defensive operations only, but by the mid-

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[39] William Roger Louis, Alaine M. Low, Nicholas Canny and P. J. (Peter James) Marshall, *The Oxford History of the British Empire, Volume III, The Nineteenth Century* (Oxford: Oxford University Press, 1998), 5-6.
[40] Scriver and Prakash, *Colonial Modernities*, 25.
[41] Anthony Webster, "The Origins of the East India Company and the Rise of Non-Company Commercial Interests in Britain, India and Asia, 1600–1793," in *The Twilight of the East India Company: The Evolution of Anglo-Asian Commerce and Politics, 1790–1860* (Boydell & Brewer, 2009), 18–38.

eighteenth century, regional wars and distrust in the motivations of the EIC by local rulers began to cause disruptions to its trade operations in the Indian colony. Increased military presence and a series of conflict resolutions escalated to wars and territorial conquests that ultimately established military and administrative rule by the EIC over the Indian sub-continent by the mid-nineteenth century.[42] Initially a trading company, The EIC was propelled to serve as a pseudo-administrative agency for the British Crown at this time.

However, unlike Britain's other colonies, India was a diverse nation of regional powers and identities. Resistance against EIC dates to early mid-eighteenth century rebellions. By the mid-nineteenth century, it became necessary to set up systems of network and centralization to regain the Empire's foothold over a highly expansive, differentiated, and fragmented colony.[43] This need for control became evident after the continued rebellions culminated in the major uprising of the 1857 Sepoy Mutiny.[44] After the tragic events of the Mutiny, British administration was officially transferred from the EIC to the direct aegis of the Crown. This period of governance from its inception to its end (1858 -1947) would come to be known as the British Raj.

Following the Mutiny, the British Raj undertook concerted efforts to create a more centralized administration, by spearheading extensive rail, hydroelectric, telegraph, and infrastructural projects throughout the nation. As discussed earlier in relation to *Rethinking Global Modernism*, the networks of modern infrastructure that were established to capitalize on resource extraction and the profiteering of the Raj, also gave increased access and agency to the

[42] Webster, "The Origins of the East India Company", 18-38.
[43] This was implemented further when King V declared the shift of the capital from Kolkata (located in the East) to Delhi (North) in December 1911 – returning the capital to the previous center of Mughal administration.
[44] Also known prominently known as the Indian Rebellion of 1857, The Indian Mutiny, and The First war of Independence.

people of India.[45] As proposed in *India: Modern Architectures in History*, authors Peter Scriver and Amit Srivastava argue that these were the early beginnings of the "colonial-modern" middle ground upon which most of post-Independence India would later be built.[46] The 'colonial modern' concept embraced by author Tani Barlow in the 1997 collection of essays, *Formations of Colonial Modernity in East Asia,* challenges the notions of modernity and colonialism as being mere imports from the West and to diverge from the idea of binaries such as modern/premodern, self/other, colonizer/colonized, etc.[47] Barlow also describes it as a way to pose the historical question of how our mutual present came to be and takes its present shape.[48] The 'colonial modern' framework attempts to view historical contexts and subsequent present-day situations as not predetermined, but instead as a complex field of relationships across space and time and surveyed through situated conditions or from specific sites.[49]

In colonial India, of the many systems inherited and imposed, the built environment was shaped through the convergence of multiple constituents that gave rise to a very situated 'modernity'.[50] Of these, a primary and pivotal institution was the British Public Works Department. To facilitate the rapidly increasing infrastructural needs of the British Raj, large-scale construction was set up under the purview of the Public Works Department (henceforth

[45] Prakash, Casciato, and Coslett, "Global Modernism and the Postcolonial".
[46] Scriver and Srivastava, *India: Modern Architectures in History,* 12; Tani E. Barlow, *Formations of Colonial Modernity In East Asia* (Durham: Duke University Press, 1997).
[47] Barlow, *Formations of Colonial Modernity In East Asia*.
[48] Barlow, *Formations of Colonial Modernity In East Asia*.
[49] Barlow, *Formations of Colonial Modernity In East Asia*; Scriver and Srivastava, *India: Modern Architectures in History*.
[50] The term 'situated modernity' within the context of the thesis expands on the idea of the 'colonial modern' as a local response to the confluence of multiple colonial and native, political and cultural factors that exhibited itself through distinct characteristics in spatial environments; The term has also been used by architectural historians such as author Sarah Williams Golhagen, on her book discussing Louis Khan's works, to describe an architectural building style that was modern but "situated" to its more local cultural setting. Sarah Williams Goldhagen and Louis I. Kahn, *Louis Kahn's Situated Modernism* (New Haven [CT]: Yale University Press, 2001).

referred to as PWD) in 1855.[51] It was an initiative spearheaded by then Governor-General Dalhousie to establish the Raj's physical presence within the Indian colony.[52] The role of the PWD encompassed the design and construction of all colonial administrative infrastructure from roads to buildings. Previously, this work was overseen by the Engineering Department of the military, regulated by Military Boards in the presidencies.[53] With the redirection away from the military body, the hope was to have increased, uninterrupted oversight of "public improvement" projects.[54]

The overbearing institutional agency of the PWD had lasting effects not only on the production of the "colonial-modern" built environment, but also on systems of knowledge and production. Despite its break from military oversight and set-up as the technical branch of the colonial administration, the top-level administration of the PWD was still heavily drawn from the existing pool of high-ranking British military engineers.[55] To this point, construction practices in the India were comprised largely of local builders and artisans trained in a master-apprenticeship system. It was a system that valued the utilization of local materials, generational training, and attention to craft and detail. Alternatively, speed and efficiency became the new key goals that defined PWD projects of this time. Both these factors called for newer construction technologies and materials not afforded by locally sourced materials, such as timber, bamboo, earth, brick, and stone. With the importation of newer materials and construction technologies, vernacular

[51] "Introduction of the Contract system in the D.P.W.", from *the List of Papers. No. 27 P.W.D Circular No.41*, dated 20th May 1862. (Regarding the introduction of a system of Contracts for the execution and repairs of Public Works). Special Collections, National Archives of India, Accessed August 2022.
[52] "Introduction of the Contract system in the D.P.W.", 24.
[53] Nivedita Nath, "The Public Works Department" in *Colonial Epistemologies* (MANAS. UCLA Social Sciences) Web Repository, created by Vinay Lal, Accessed 20th Feb 2023.
[54] Nivedita Nath, "The Public Works Department
[55] Although historical documentation indicates that the execution of their duties was highly supported by their Indian subordinate builders.

knowledge was soon ousted by the desire for supervision by "specialists" and "professionalization" of the field - often helmed by British architects and engineers.

Scriver and Srivastava argue that the systems of building and construction set up by the PWD formalized the building patterns that would continue to be adopted post-Independence as well. Alongside other institutional frameworks, the systemic building practices and technologies were part of the larger project of "Rationalization" by the British Raj.[56] Defined by Scriver and Srivastava in part as the "adoption of a consciously rational approach to the design and production of the built environment", it extended to various socio-economic fields, including education policies such as the adoption of English as the official language of government and higher education and land tenure reforms.[57] Multiple factors contributed to the rationalization of the Indian building industry - the 'departmentalization' of the industry, the standardization of building conventions, and the oversight by PWD British architects and engineers.[58] Author Ernest Havell observed that, besides the shifting practices away from craft, the adoption of "paper based design methods" became a crucial factor for the cultural shift in the building trade of India.[59] By this, Havell is referring to the relegation of all official building activity to the supervision of the PWD which followed the Western hierarchy of architects and civil engineers. Modes of production inevitably shifted from on-site building practices to blueprints drawn up within the PWD offices. This not only took away agency from local builders but also meant the

[56] Scriver and Srivastava, *India: Modern Architectures in History*, 23-68; For more on the theory of Rationalization see works by Max Weber and Jurgen Habermas', *The Theory of Communicative Action*, 1981.
[57] Scriver and Srivastava, *India: Modern Architectures in History*, 23-68.
[58] Scriver and Srivastava, *India: Modern Architectures in History*, 23-24.
[59] On Ernest Havell. Scriver and Srivastava. *India: Modern Architectures in History*, 23-24; E. B. (Ernest Binfield) Havell, *Encyclopedia of Architecture in the Indian Subcontinent, vol. ii: Medieval and Later* (New Delhi, 2000), vi.

loss of local building styles, layouts, details, and ornamentation in the translation to "paper" based designs.[60]

Part of the rationalization ethos was visible in the types of structures the PWD commissioned. The buildings designed had arisen out of a need to "solve" the problems of housing and infrastructure for British officers and administration. Peter Scriver states that British designers and planners created spaces and structures that would minimize the "politically complex cultural landscape" and restrict social and ethnic divisions and categories, thereby making them "sensible and manageable".[61] In keeping with its bureaucratic technocracy, the PWD employed a system of "typical" buildings and "prototypes" that favored both speed of construction and financial economy in terms of building costs and materials.[62] From communal barracks to post offices, PWD buildings began to take on a similar aesthetic and organizational logic all across the sub-continent. Seen here is a set of standard plans of mess houses for the officers (Fig.02).[63] The "typical" module could be parametrically added onto to accommodate British officers while the smaller "base" design was intended for native officers.[64] Another set of plans for traffic staff quarters employs a similar strategy of permutations (Fig.03). The largest units were designed for the "Station Master" and the subsequently smaller units for lower ranking officers.[65] Both designs exhibit a "default reasoning" of spatial organization that had been worked out to a scientific formula by PWD engineers and architects to be deployed across

[60] For more on this topic see, Chanchal B. Dadlani, *From Stone to Paper: Architecture As History In the Late Mughal Empire* (New Haven: Yale University Press, 2018).
[61] Peter Scriver, "Empire-Building and Thinking in the Public Works Department of British India," in *Colonial Modernities: Building, Dwelling and Architecture In British India and Ceylon*, eds. Peter Scriver and Vikramaditya Prakash (London: Routledge, 2007), 72.
[62] Scriver, "Empire-Building and Thinking", 73; Scriver and Srivastava. *India: Modern Architectures in History,* 30-56.
[63] Scriver, "Empire-Building and Thinking", 84-87.
[64] Scriver, "Empire-Building and Thinking", 84-87.
[65] Scriver, "Empire-Building and Thinking", 84-87.

the colony.[66] This was in direct contrast to the highly varied and intricate Hindu and Muslim architecture of the empires and rulers that had preceded the British Raj.[67] And while efficiency and financial economy were driving factors of rationalization, the execution of standardized designs and projects began to transform building practices. But above all, they reinforced the values of imperial conventions.[68]

These examples and numerous other PWD structures were built out of a combination of both concrete and local masonry during the nineteenth century. These structures soon became common sights in the Indian landscape and reinforced standardization in building practices. This in turn coincided with the growing global popularity of concrete in constructions practices, including those back in England. The Indian colony became an ideal test bed to promote and experiment with the structural and aesthetic capabilities of concrete. Furthermore, it aligned with the values of PWD construction practices of the time such as efficiency, cost reduction, sanitation, standardization, and modularity. Concrete increasingly came to be employed as the obvious material to help facilitate the infrastructural needs of the Empire. Viewed as needing a "scientific" method of construction with its perfect ratios and patented building systems, it further deepened the divide between the architect, the laborer, and ultimately the consumer.

Material Production

While aggregate, sand, and water were locally sourced, the early requirements of cement and steel for the Public Works projects were fulfilled mainly by British imports from the UK, creating dependent institutions of production and consumption. In 1914, records indicate that

[66] Scriver, "Empire-Building and Thinking", 84-87.
[67] Scriver, "Empire-Building and Thinking", 74.
[68] Scriver and Srivastava, *India: Modern Architectures in History*, 57.

150,530 tons of cement were imported, versus 945 tons of local production.[69] According to Stuart Tappin, the demand for cement around this time was high enough for London agents to re-export German cement to India under a brand named "Gladiator".[70] When it came to locally produced cement and steel, the products had to meet rigorous British construction standards irrespective of the nature or scale of the construction project. However, as mentioned by Forty, the nature of the 'modernity' of concrete, was inherently contradictory.[71] It was both modern and primitive. Employed by skilled professionals but also executed by local labor; its theoretical aspirations were often at odds with its popularization and local adoption. While it was actively enforcing the visions of the Empire, it was also transforming systems of production from the bottom up.

The first known domestic "standardized" production of Portland cement is attributed to a small-scale factory established in Madras (now Chennai) in 1904 by a company named South India Industrial Limited.[72] Large-scale industrial production of cement in India began in 1914, with the opening of the first cement factory in Porbundar in Gujarat.[73] Incidentally, in 1912, Tata Steel, the nation's primary domestic steel producer, rolled out its first successful production run.[74] Tata Steel quickly became synonymous with all steel production in the country and by the advent of World War II, its manufacturing became efficient enough to price out the then imported steel from the UK. In less than five years after the first factory was set up, domestic

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[69] Concrete Association of India, *Handbook and Directory of the Cement Industry in India* (Bombay. 1929), 2, from the Digital Library of India, Internet Archive, accessed 2023.
[70] Cement for India, *Architects' and Builders' Journal* (1911), 143, cited in Stuart Tappin, "The Early Use of Reinforced Concrete in India," in *International Congress on Construction History* (1:2003: Madrid) Volume III, 1931-1940.
[71] Forty, *Concrete and Culture*.
[72] Ravi B and Shambulingappa F Nallanavar, "History and Growth of Cement Industry in India: A Study." *Journal of Emerging Technologies and Innovative Research (JETIR)*. January 2022. Vol. 9, Issue 1.
[73] Concrete Association of India, *Handbook and Directory of the Cement Industry in India*, 2.
[74] "Heritage", Our Organisation, Tata Steel, Web portal. Accessed 18th September 2022. https://www.tatasteel.com/corporate/our-organisation/heritage/

cement production was already overturning the former trade deficit (Fig.04). By 1928, Portland cement production had almost quadrupled, with a recorded domestic production of 557,953 tons against 74,700 tons of imports (Fig. 04).[75]

The 1920s quickly saw a turnaround for concrete with its applications extending beyond ambitious infrastructural projects. Concrete was increasingly used outside of PWD projects and employed in private projects like housing, industry, and commercial buildings.[76] The fact that material demands were increasingly being fulfilled by domestic manufacturers, encouraged the private cement companies to band resources together into more centralized institutions. The first recognized domestic association of cement manufacturers in the country was formed in 1925, known as the *Cement Manufacturers Association*. This was soon followed by the formation of the *Concrete Association of India (CAI)* in 1927, and in 1930, the *Cement Marketing Company of India* was established. In 1936, another merger took place, with prominent cement companies coming together to form the *Associated Cement Companies Ltd. (ACC).* ACC continues to be one of the top three cement manufacturers in India today. Coupled with the establishment of these key market players, the post-independence government, adopted a *Cement Expansion Scheme* in 1948, with the aim to set up newer sites of production.[77] By the early 1950s there were 22 manufacturing units with an installed capacity of 3.3 million tons.[78]

The establishment of these institutions along with the monopoly established by Tata Steel marked the advent of a new set of "institutional frameworks". While their factories enabled production, these institutions themselves largely dealt with the promotion of cement and concrete use within the country. Through various journals and publications, both ACC and CAI went on

[75] Handbook and Directory of the Cement Industry in India. 1929. p. 2.
[76] Stuart Tappin, "The Early Use of Reinforced Concrete in India."
[77] B and Nallanavar. "History and Growth of Cement Industry in India."
[78] B and Nallanavar. "History and Growth of Cement Industry in India."

to become influential in the proliferation of concrete in the Indian imagination. The next section delves further into the agency of these institutions, the methods employed by them and their echoes on the rapidly evolving Indian built landscape. While what ensued was a transition from the colonial project of control to post-colonial visions of modernity, it is important to note that multiple bureaucratic practices and legacies had already been set in place and colonial modern India had come to rely heavily on them. Due, in part to its familiarity and convenience and in part by the lack of successful systems to replace it, colonial systems of governance and bureaucratic policies continued to be retained and implemented in the post-independence period.

The Post-colonial State: A Transitional National Landscape

India's freedom struggle against the Crown finally culminated with Independence on August 15th, 1947. When the first prime minister of independent India, Jawaharlal Nehru, addressed the nation at the stroke of midnight, he announced the nation's long-pledged "tryst with destiny" – to "awake to life and freedom". However, at that very moment, freedom for British India meant the cementing of the harrowing demarcation lines drawn for Partition.[79] The logistical execution of Partition, consisting of over 14.5 million border crossings, 3 million missing persons, including deaths of almost 750,000 people - was the single largest mass migration in human history. All of which had ensued during less than three chaotic and violent months.[80]

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[79] Partition marked the end of the British Raj on the Indian subcontinent and refers to the division of its territory into two independent nation states, India and Pakistan. The demarcation lines for the separation of India and Pakistan were officially published to the public on 17th August, 1947.

[80] Prashant Bharadwaj, Asim Khwaja, and Atif Mian. "The big march: migratory flows after the partition of India," in *Economic and Political Weekly* (2008), 39-49; Stuart Roberts, Edward Anderson, and Joya Chatterji. *Freedom and Fragmentation: Images of Independence, Decolonisation and Partition* (October 2017), Centre of South Asian Studies. University of Cambridge, Web Repository, accessed February 2023. https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#at-the-stroke-of-midnight-4.

Having studied and trained at the Trinity College in Cambridge, Nehru had an explicitly 'modern' vision for India – one rooted in socialist, secular, and democratic principles.[81] Scriver and Srivastava define Nehru's vision as a "techno-scientifically rational pursuit of planned progress" one that could be measured in socio-economic terms.[82] Despite Nehru's grand visions of modernization, the reality of the nation was that over eighty percent of the population at that time continued to live in rural villages and conditions.[83] Additionally, dealing with a poorly planned assimilation process as a result of Partition, the government was struggling to house refugees. A large portion of these refugees also found themselves seeking livelihoods within the nation's largest cities of the time, namely Delhi, Bombay (Mumbai), and Calcutta (Kolkata). Coupled with growing urban migration, this added further pressure on the resources and built infrastructure of these cities. Under these circumstances and a turbulent transition into a post-colonial state, the government began to fall back on the familiar systems of production and administration of its colonial-modern past. Freedom didn't immediately mean a new nation. India, helmed by Nehru, continued to grapple with its inherited systems of bureaucracy its visions for a modern future.

Nehru's government was faced with similar challenges as its British predecessor. No longer united by the cause for Independence, religious, cultural, political, and class differences continued to pose a risk to the stability of the nation. The following decades continued to witness "technocratic paternalism" and "centralizing tendencies" inherited from the British administration.[84] At the same time, as one of the founding members of the Non-Aligned States,

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[81] Roberts, Anderson, and Chatterji. *Freedom and Fragmentation.*
[82] Scriver and Srivastava, *India: Modern Architectures in History*, 130.
[83] C. Chandramouli, "Rural Urban Distribution of Population (Provisional Population Totals)," in *Census of India 2011,* from the Office of the Registrar General & Census Commissioner, India, Ministry of Home Affairs, Government of India (New Delhi: 15th July 2011), 19. Census Digital Library, accessed on April 2023.
[84] Scriver and Srivastava, *India: Modern Architectures in History*, 18.

India continued to maintain its independent status in international political affairs. In a period of experimentation, the country was also vying to replace its inherited colonial policies while looking towards the Soviet Union and socialist democracies of Europe for examples of centralized, social, and technological advancement schemes.[85]

The "modernist-progressive" vision of Nehru's government entailed the charting and implementation of a series of 'Five-Year Plans' aimed at improving the nation's infrastructure, agriculture, and socio-economic sectors. The Second Five Year plan (1956-61) explicitly focused on "rapid industrialization" and saw the establishment of multiple hydroelectric dams, power and steel plants.[86] In the search for a new secular identity, Nehru dubbed the heavy industry projects as the "new temples" of modern India.[87] These huge undertakings, built exclusively of concrete, were quite prominent on the built landscape and became new tokens of progress and modernity (Fig.05). Concrete use, under Nehru, employed in these infrastructural projects, had a new symbolic rebirth.

On the political and architectural history of Mozambique, author David Morton notes that the shape of a city is not purely a result of top-down imposition or a grass-roots orchestration. Instead, he notes, that it is a result of "the friction of many interests colliding in tight confines".[88] Similarly, the situations and conditions described above lay out the complicated terrain amidst which the 'colonial modern' or 'modern' in India was being defined by experiments, in what was essentially a system of trial and error. These distinct factors, which have been identified, but are

[85] Scriver and Srivastava, *India: Modern Architectures in History*, 18.
[86] Scriver and Srivastava, *India: Modern Architectures in History*, 18.
[87] Suni Khilnani, *The Idea of India* (London: H. Hamilton, 1997).
[88] David Morton, *Age of Concrete: Housing and the Shape of Aspiration In the Capital of Mozambique* (Athens: Ohio University Press, 2019), 12.

not all encompassing, set the stage for the situated modern that was to evolve in the everyday built landscape of India as part of its post-colonial identity.

"Modernity"- (as) Cultural and Social Capital

Derived etymologically in direct contrast to the 'ancient' and 'medieval', 'modernity' denoted "of pertaining to present or recent times".[89] But, as Göran Therborn puts it, "the present is then the beginning of the future."[90] Being a variable time concept, one that denoted a "new epoch", 'modernity' increasingly came to symbolize the potential of the future rather than the realities of the present.[91] In this context, 'modern', 'modernization', and 'modernity' became tools for "reorienting the present towards the open horizon of novelty" – the future.[92] Baudelaire describes 'modernity' as that which is "ephemeral, the contingent, the half of art whose other half is eternal and immutable."[93] Jan Nederveen Pieterse describes that in the Marxist theme of global market spread, 'modernity' is driven by the two core corollaries, the structures of nation state and individualization.[94] In *The Times and Spaces of Modernity*, King alerts us to the fact that the 'modern' began to take on a positive connotation in discourse only in the nineteenth and twentieth century.[95] Prior to this, the need to alter something or 'modernize' it was seen as unfavorable. King also poses the question as to how and against whose criteria this "positive"

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[89] Basically, a concept of time, 'modernus' originally developed in medieval Latin as a contrast to the ancient, and to antiquity (Calinescu, 1987: part 1). And later from its more common French usage of 'moderne'; Mike Featherstone, Scott Lash, and Roland Robertson, eds., *Global Modernities* (London: Sage Publications, 1995).
[90] Göran Therborn, "Routes To/Through Modernity," in *Global Modernities*. Featherstone, Lash, and Robertson, eds., 131.
[91] Therborn, "Routes To/Through Modernity", 131.
[92] Therborn, "Routes To/Through Modernity", 132.
[93] Charles Pierre Baudelaire (1863), cited in Marshall Berman, *All That Is Solid Melts Into Air: The Experience of Modernity* (New York: Simon and Schuster, 1982), 133.
[94] Jan Nederveen Pieterse (1987), cited in Pieterse "Globalization as Hybridization," in *Global Modernities*, Featherstone, Lash, and Robertson, eds., 55.
[95] Raymond Williams (1984), cited in Anthony D. King, "The Times and Spaces of Modernity (Or Who Needs Postmodernism?)," in *Global Modernities*. Featherstone, Lash, and Robertson, eds., 115.

connotation is measured?[96] As mentioned, modernity quickly morphed to be understood as that defining 'of the present'. Given its spatial and temporal groundlessness, modernity takes on a mutable quality which makes assigning value problematic, or, as King describes it, "empty of meaning".[97] This theory is further echoed by Therborn, who states that it is precisely this vagueness afforded to modernity that makes it capable of adopting and being adopted across a multitude of institutional phenomena – political, economic, and social.[98] However, it is also this very ability of modernity to take on meanings suitable to the dominant narrative that concrete distinctly mimics as a material of many meanings.

Memory and contemporary sociological usage of the modern has been monopolized by the narrative of the Industrial Revolution and nineteenth and twentieth century technological and economic developments that took place in the West – specifically Europe and USA.[99] With its "emphasis on rationality, order, the state, control, and the belief in progress", scholarship also ties the conception of 'modernity' to the project of Enlightenment.[100] It is hard to ignore the parallels in the "values" inscribed in the cultural movement of modernity to the colonial projects of Empire exercised by various European powers the world over. Colonies underwent fundamental restructuring following similar values of the Enlightenment, which were seemingly 'modern'. This brand of modernization, one oriented in Western spatial and temporal origins, was then conveyed globally through channels of colonialism and capitalism.[101] This theoretical

[96] King, "The Times and Spaces of Modernity."
[97] King, "The Times and Spaces of Modernity."
[98] Göran Therborn, "Routes To/Through Modernity," in *Global Modernities*. Featherstone, Lash, and Robertson, eds., 131.
[99] King, "The Times and Spaces of Modernity,"115-116.
[100] King, "The Times and Spaces of Modernity,"116.
[101] King, "The Times and Spaces of Modernity,"117. For more on this topic also see works by Chinua Achebe.

framing helps further elucidate that modernization and its processes are indivisible from its colonial sites of production.

Recent scholarship, however, has turned away from the synonymous narrative of modernization/Westernization. For instance, Pieterse suggests viewing modernization as being arrived at through "multiple paths".[102] Similarly, Benjamin Nelson's view of "intercivilizational encounters,"[103] or Pred and Watts's theory that "all societies create their own modernity,"[104] are suggestive of more hybridized, global systems of modernity. However, across all these varied definitions, the positive connotations linked with modernity continued to dominate the popular imagination and were seen in the colonies and post-colonies as both a way to connect with the world – like speaking a similar language - and as metric for social "progress".

Modernity in post-colonial India then was both inherited from prevailing British practices and dispositions (the past), but also from newly reinterpreted ideals for the future. In the context of the evolving built environment and within journals published by associations of producers, 'modern' quickly referenced constructing both in an aspirational style and in the material symbolizing a prospective future. Concrete itself, and by extension 'modernity', became the relationship that overrode the actual object - the (concrete) home. In his critique of social norms and taste, Pierre Bourdieu notes that appearances always supported appearances.[105] In journals catering the "masses", concrete became the unanimous vehicle chosen for the realization of the aspirations of the homeowner and the nation.

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[102] Pieterse, "Globalization as Hybridization," 57.
[103] Benjamin Nelson, *On the Roads to Modernity: Conscience, Science, and Civilizations: Selected Writings* (United States: Rowman and Littlefield, 1981).
[104] Allan Richard Pred and Michael Watts, *Reworking modernity: Capitalisms and Symbolic discontent* (New Brunswick: Rutgers University Press, 1992).
[105] Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste*, (Cambridge, Mass: Harvard University Press, 1984), 22.

Private enterprises within the Indian building industry quickly began to embrace and echo the larger visions of progress earmarked as the new national identity by Nehru. With increased migration to cities and across the country, a nation previously rooted in regional values and cultural differences began to shapeshift into its own complex hybrid. Most products could be marketed in a more universal sense. However, a home, which was a commodity rooted in fundamental personal preferences, yet viewed as the highest measure of social status, was reframed under the unifying metric of 'modernity' or the 'modern' home.

The larger national political, economic, and social landscape of mid-twentieth century India is one that is hard to encapsulate fully or truly within this chapter.[106] While 1947 marked the official year of Independence, both the decades before and after it were plagued with rapid political, economic, and social changes. Alongside the freedom struggle, World War II was experienced globally and had long-lasting repercussions for all nation states. Most private enterprises were able to foresee the potential of the Indian market long before Independence.[107] As the next chapter discusses, what likely shifted were the audiences to whom they would cater.[108]

[106] For more on economy and politics of 20th century India see Raju J. Das, *Critical Reflections On Economy and Politics In India: A Class Theory Perspective*, (Leiden: Brill, 2020).
[107] Rajnarayan Chandavarkar, *The Origins of Industrial Capitalism In India: Business Strategies and the Working Classes In Bombay, 1900-1940* (Cambridge: Cambridge University Press, 1994).
[108] Entrepreneurial businesses were already established and thriving pre-Independence and catered to both British and Indian elites. The consumer base begins to shift with the socio-economic rise of the middle class in India. For more on the rise of the clerical middle class see Nikhil Rao, *House, But No Garden: Apartment Living In Bombay's Suburbs, 1898-1964* (Minneapolis: University of Minnesota Press, 2013).

Chapter II: The Assemblage

'A Family Home', 2017. Mangalore, India.

(Photograph by author. Not to be reproduced)

> "This book is a book of ideas. In presenting it, our intention was to provide a source of inspiration for those who are dreaming of a house of their own…"[109]
>
> - *Foreword*, Designs for Modern Living. 1975

After the formation of the Concrete Association of India (CAI) and the Cement Manufacturer's Association, the institutions allocated a significant portion of their resources towards the publication of multiple instructional and advertisement journals. These institutes tasked themselves with educating all groups of cement and concrete users on the latest technologies and aesthetic opportunities afforded by the material, with the aim of providing "free technical services to cement users."[110] A 1959 publication, titled *Notes for the Cement User*, lists the following goals for CAI as an institution:

> The Association's work may be said to fall into three principal divisions:-
>
> 1. Promotion, educational work and t(e)chnical (sic.) service, through its Head Office and Regional Offices, to extend the uses of Portland cement and improve the quality of concrete.
> 2. Development in concrete technology, design and methods of construction.
> 3. Development of new and improved products and methods of using cement.[111]

During the 1930's alone, CAI published 39 journals on building infrastructure in concrete and cement.[112] The topics ranged from advice on the construction of roads and driveways to the fabrication of objects like gates and fenceposts. Certain issues were also solely dedicated to

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[109] Concrete Association of India, *Designs for Modern Living: 32 Architect Designed Houses Shown in Plan and Perspective* (Bombay, 1975).
[110] Concrete Association of India. *Notes for the Cement User* (Bombay, 1959).
[111] Concrete Association of India. *Notes for the Cement User*, 72.
[112] Tappin, "The Early Use of Reinforced Concrete in India," 84.

addressing fundamental topics, such as the *Storage of Portland cement*.[113] These early publications of the 1930's were reflective of the more global practice of technical and architectural pattern books and builders' manuals. They assumed the reader to be the direct consumer of the final product and provided detailed construction advice, such as concrete mixing ratios, steel reinforcement details, and load bearing capacities for various concrete column and beam construction designs. In her work on Indian consumption practices of the twentieth century, Abigail McGowan notes that the early industry gave aspiring Indian homeowners more agency and equipped them with the knowledge to assume a more active role in the realization of their domestic dreams.[114]

Government rationing during this time, due to the Second World War, placed increasing restrictions on the building industry and the production of both cement and steel. The culminating stage of the Freedom Struggle during the 1940's also disrupted domestic supply networks and curtailed consumption practices. While there was a brief decrease in the publication of these journals that is observable from 1940's to the early 1950's, these institutions continued to market the possibility of owning a home to the Indian consumer, even in times of national and global distress. Was this simply part and parcel of an advertising strategy, or the optimism sought for a new nation on the horizon?

This mass media strategy employed by CAI and the other Indian institutions was in no way novel, but instead reflected broader marketing practices of the global concrete industry. Even Hennebique's success has now been attributed not solely to the patenting or superiority of his system, but also to the publicity tactics that were employed by his firm. From 1898 to 1939,

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[113] Concrete Association of India, *Storage of Portland Cement* (H.E. Ormerod for the Associated Cement Companies, Ltd., Bombay, 1938).
[114] McGowan. "Consuming the Home," 141.

Hennebique published a monthly journal called *Le Béton Armé*, which addressed contractors and potential clients (Fig. 06).[115] Stephanie Van de Voorde argues that the 378 issues that were published, functioned as an "interface between information and propaganda".[116] Contents of *Le Béton Armé* included technical articles, listings of agents and concessionaries, and images of projects in progress or completed by the firm.[117] Part of Hennebique's advocacy of concrete construction involved reprimanding the steel industry, which, at the time, was its foremost contender as the 'material of the future'. As part of its campaign, issues of *Le Béton Armé* regularly published photographs of damaged steel buildings due to fire incidents and failed structures.[118] Fire-resistance, a highly desirable property in 'modern' built structures, became a vital selling point for both Hennebique and concrete construction more broadly. Hennebique and his competitors were aware of the captivating power of the images published within these journals and their appeal to increase public consumption. The modernity of concrete was then perhaps in equal parts its ability to align itself with other rapidly evolving systems of communication and information dissemination, such as visual and print media. As Forty remarks, "What Hennebique produced were not buildings, but images of buildings…"[119]

The Language of Aspiration: (Publications of the) 1940's to 1970's

As mentioned in the previous chapter, the transitional post-colonial landscape witnessed accelerated urban migrations as well as the implementation of top-down "technocratic" policy. Although the events of Second World War and the final stages of the Freedom Struggle placed

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[115] Julia Morgan Charles, "Shaping Time in the City: A Cultural History of Concrete Modernity in Montreal, 1903--2015", (PhD diss., McGill University, 2015), 40-41.
[116] Stephanie Van de Voorde, "Hennebique's Journal le Béton Armé : A Close Reading of the Genesis of Concrete Construction in Belgium," published in *Proceedings of the Third International Congress on Construction History* (Cottbus, May 2009), Accessed from Ghent University Academic Bibliography.
[117] Van de Voorde, "Hennebique's Journal le Béton Armé."
[118] Forty, *Concrete and Culture*, 22-23.
[119] Forty, *Concrete and Culture*, 21.

limitations on the building industry, construction and infrastructural needs in newly independent India continued to steadily grow.

If CAI and the Cement Manufacturing Companies' earlier publications of the 1920s and 1930s addressed engineers and contractors, the publications of the late 1940s onwards began to appeal more directly to the consumer, notably in very different ways.[120] While the earlier publications focused on introducing the technical capabilities of concrete, complete with formulaic calculations for steel and cement ratios, these later journals were predominantly filled with colorful spreads of renderings of bungalows, duplexes, and apartment complexes. There was a noticeable shift from text-heavy instructions to issues dominated by a more images. McGowan notes that CAI's 1946 publication, *Sixty Designs for Your New Home,* comprised merely seven pages of text in comparison to its 60 pages of illustrations and graphics.[121] Furthermore, the technical architectural graphics - mostly plans - occupied only a small fraction of the page and served as mere spatial and proportional guidelines, suggestive of different kinds of zoning and segregation. Most of the spread was allocated to the striking three-dimensional renderings (Fig. 07). McGowan notes that the publications began to move from the notion of the home as a place of shelter and stability to "a site of leisure and consumption".[122] The (concrete) home became the backdrop against which life's daily aspirations could be played out and fulfilled. At the domestic scale, the concrete home became the aspirational typology of this new situated modern.

In *The Poetics of Space,* Gaston Bachelard emphasizes the value of the visual or "engravings" in their ability to convey deeper meanings.[123] While Bachelard's analysis engages

[120] Library Catalogue, National Library of India (Kolkata, India), accessed May 2022.
[121] McGowan, "Consuming the home."
[122] McGowan, "Consuming the home," 141.
[123] Gaston Bachelard and Jolas M. *The Poetics of Space (*Boston: Beacon Press, 1994), 29-33.

with a more literal concept of poetic imagery, the connotations of interpretative visual mediums are similar. The poetic image resonates with the reader, causing reverberations with both past and future ideals housed within the self. Bachelard notes that the image "reverberates" and "takes root" within the reader and becomes their own.[124] Housed within these journals were poetic images of aspiration. The visions of the new house were, at its core, still a house. The visual power of the poetic image, however, conveyed extended possibilities. The poetic image both represented a new lifestyle but also a new material: concrete. In fact, it became almost impossible to separate one from the other. Adopting concrete meant adopting an urbane lifestyle and vice versa. It became apparent that the institutions and the journals they published were acutely aware of both the apprehension also the ways in which concrete could excite the Indian imagination. Much like Bennett's theory of assemblages, these journals broke down the traditional and familiar home into its constituent parts, only to repackage it with the sensibilities afforded by concrete as a material.

While the imagery contained in these journals played a crucial role in evoking aspirations of the home, the limited language was also carefully curated to appeal to the perceived likes and dislikes of the Indian consumer. The text accompanying these images often emphasized domestic social parameters such as "privacy", "exclusiveness", "order", and "comfort", to name a few.[125] While these parameters had always been a part of local building typologies in other forms, these journals, by associating them with the modern, were managing to create previously non-existent categories of exclusivity within the Indian domicile (Fig. 08 & 09).

Writing on taste and cultural consumption, Bourdieu notes that the social use value of an entity likely surpasses its functional value and further that, "most products only derive their

[124] Bachelard, *The Poetics of Space*, xxii -xxiii.
[125] Concrete Association of India. *Designs for Modern Living*.

social value from the social use that is made of them."[126] Bourdieu goes on to explain that class-based usage of entities becomes strongly tied to the social value that is attached to them. Calling our attention to the mediums that help facilitate this process, he deems it necessary to pay attention to the *ways* in which these ideals are instilled. Within these journals, we see that the *ways* that do get employed are multiple. Firstly, the medium itself. Despite print media becoming popular and affordable, the notion that information attained from books is curated and vetted by experts in the field already ascribes to it a higher value in the perception of the consumer. Second, the material that these designs were perpetuating was concrete, which was by now gaining public recognition as futuristic, aspirational, and above all modern. And lastly, the imagery and vocabulary contained within these journals themselves, which cued its readers to a more aspirational lifestyle.

Alongside relying heavily on the visual appeal of these architectural renderings, there is also a strong emphasis and repetition of the word 'modern' across the titles and descriptions of many of these designs within the journals (Fig. 10 & 11). It is evident that an attempt was being made to reintroduce a familiar typology such as a home or an office building, int a new material landscape. This new hybrid, which was christened 'modern'.

Marketing the 'Modern' in India: The 'Modern' Home

In a 1965 journal, *40 Designs for Low-cost Houses*, a design spread for "semi-detached cottages" asks the reader to take note of the roof that gives "a rural character to the place" (Fig.12).[127] The overbearing roof, likely also serving a climatic purpose, is utilized to evoke

[126] Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste* (Cambridge, Mass: Harvard University Press, 1984), 21.
[127] In the 1965 publication, *40 Designs for Low-cost Houses*, we are provided with a similar blueprint for the designs. This publication however attempts to classify its designs based on spatial-economic terms, with categories

familiar memories of home. Bachelard's idea of resonance can very well be applied to this instance. A closer analysis of the floor plan indicates the presence of a 'verandah' retrofitted to a more contemporary home layout.[128] The description of the design ends by stating that it is a "harmonious blend of the old and the new." By utilizing the verandah, the design retains the semi-public socializing space of the traditional home. In this example, one can argue that an attempt is being made to ease consumers into a more "modern" concrete home by the utilization of familiar building elements.

In another design for a "detached bungalow", the plan is described as symmetrical, like in the "old Indian tradition" (Fig. 13).[129] The layout of the plan is organized to mimic a traditional Indian courtyard home (Fig. 14). The proposed design swaps out the traditional open-to-the-sky central court with the living room. This change also helps indicate how building practices were shifting. A traditional courtyard, which would have previously served as a communal spill-out space is now being substituted by an enclosed 'living room'.[130] This shift immediately makes the design marketable to a wider audience across the climatic regions of India. An enclosed plan such as this could also be easily accommodated within a dense urban setting and in high rise buildings at any level. These examples also feature the permeation of new spatial markers, reinforced by their English terminologies. Did labelling the space as a 'living room', instead of varying vernacular terminologies also transform the daily activities that occurred within? For example, a vernacular Kerala-style courtyard house known as "Nalukettu"

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such as "urban" and "small-town districts". Concrete Association of India, *40 Designs for Low-cost Houses (Bombay, Reprint, 1965),* Special Collections, National Library of India, accessed August 2022, 47.

[128] A 'verandah' is a roofed, open-air gallery or porch that extends from the main structure. Verandahs are common building elements found across vernacular Indian homes, but more prominent in the tropical and coastal regions. Indian verandahs are found fronting the entrance and serve as a transitional space to the main living quarters. They are also important communal and semi-private socializing spaces.

[129] Concrete Association of India, *40 Designs for Low-cost Houses,* 26.

[130] Concrete Association of India, *40 Designs for Low-cost Houses,* 26.

in the state language of Malayalam, translates to "four blocks".[131] A Karnataka-style courtyard house, referred to as "Thotti Mane", has its etymological roots in the collection of rainwater. A more northern example, like the "Haveli" or "Haweli", symbolizes "partition" of spaces, or "private space".[132] The substitution of historically and culturally significant terms inadvertently signaled the loss of nuance in the versality of this central communal space. Did this simplification of language create cultural voids that were then replaced with performances of 'modernity'? Socially and culturally significant spaces within the Indian home were likely lost in translation – as was the case, for the activities they enabled. Nevertheless, this displacement also deconstructed social hierarchies and afforded freedom and opportunity to those looking to craft new spaces in which to reinvent themselves.

It also interesting to note that the terms verandah and bungalow were increasingly being associated with British adopted domestic typologies.[133] A bungalow was a respectable residence for British officers in India and indicated a comfortable lifestyle. The verandah was a common feature in bungalows and was seen as a space of comfort, leisure, and entertainment. Indian elites in urban circles often attempted to mimic the consumption practices and tastes of their British counterparts as a means to achieve equal social standing. By employing these terms, the journals were also appealing to the prevailing Indian aspirations of English notions of taste and class.

A further description of this design states that the kitchen and service areas are relegated to the rear "according to tradition" (Fig. 13). This sentence suggests that Indian sensibilities were

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[131] William A. Noble, "Houses with Centered Courtyards in Kerala and Elsewhere in India." In Paul Hockings, Ed., *Dimensions of Social Life. Essay in Honor of David G. Mandelbaum* (Berlin, Mouton De Gruyter, 1987), 215–262.
[132] Noble, "Houses with Centered Courtyards;" For more on the courtyard in the Haveli's (Haweli) see also, Inga Bryden, "'There Is No Outer without Inner Space': Constructing the Haveli as Home," in *Cultural Geographies* 11, no. 1 (January 2004), 26–41.
[133] For more on the bungalow see Anthony D. King, *The Bungalow: The Production of a Global Culture* (London: Routledge & Kegan Paul, 1984).

not yet ready to wholly embrace Western layouts, such as an open or visible kitchen area. The notion of service spaces being provisioned towards the rear not only had cultural associations but was also deeply rooted in hierarchies of gender and caste within the Indian domestic space.[134] So, being able to choose which aspects of the traditional home to embrace and which to discard was also crucial to the marketing of these designs. While the design just discussed was under the sub-category of homes for "rural districts", on the following page, we are introduced to a set of designs for "suburban or small-town districts". This section, geared to somebody more financially equipped, already assumes a more 'modern' disposition in the consumer. We see this in the designs which are also more aspirational in their scope, since they consist exclusively of duplexes with larger building footprints. The "traditionality" of the courtyard space, is still emphasized, but lesser concern is directed to where the kitchen is located (Fig. 15). [135]

In his argument on the evolution of the shotgun house within the American context, John Vlach states that subtypes of building typologies require time for the development of variations and extensive experimentation to become standardized. He states that, "subtypes arise from experimental attempts to solve problems not initially anticipated when a house form is first used."[136] For a process that typically ensues over decades, the modification of known Indian house-forms to new typologies was rapidly accelerated by the introduction of concrete into the systems of production. Concrete not only allowed for a heightened period of experimentation, but also widened the audience that could do so, from on-site laborers to architects in firms. It

[134] Indian social structures are historically rooted in its caste system which continues to dictate socio-cultural interactions across fields of Indian study. For more on the topic see works by B. R. Ambedkar. Also see Jadhav Narendra, *Untouchables: One Family's Triumph Over the Caste System In Modern India* (New York: Scribner, 2005).
[135] Concrete Association of India, *40 Designs for Low-cost Houses,* 27.
[136] John Michael Vlach, "The Shotgun House: An African American Legacy," in *Common Places: readings in American Vernacular Architecture,* 58-78.

also allowed for a varied scale of experimentation from the modest Indian home to large-scale housing complexes. Using quasi-traditional designs was one of the ways these institutions tried to convince consumers to adopt a 'modern' home. It is evident here that both the systems of production and consumption were trying to navigate these complex sensibilities in this rapidly evolving, transitional, material landscape.

Following the popularity of the 1946 journal published by the Cement Manufacturing Company, titled *Sixty Designs for Your New Home*, CAI published a reprint in 1975, titled *Designs for Modern Living*. In the foreword, the editor, a chief engineer for CAI, proposes that these designs have been provided by "practicing Indian architects".[137] This allusion alerts the reader that these visions are local in their production, but also international in their aspiration. In a design titled "past and present", we see an image of a home with a pitched roof and large floor-to-ceiling openings leading out onto an expansive, paved terrace (Fig.08). This design claims that it is "not altogether rejecting the past", and while there is no explicit mention of concrete, the predominant feature of the home - the sloped roof - has been swapped from a traditional tiled, pitched roofing system to one with a concrete slab.[138] Another design, titled "a modern house follows tradition" is more telling (Fig. 16). Drawing inspiration again from the traditional courtyard home, the design advocates for a "restful court" that reminds the reader, of houses built and loved by their grandparents.[139] However the central courtyard space is instead labelled as "patio". Images and words are carefully curated to invoke feelings of nostalgia in the reader. Was the manipulation of traditional built forms a reflection of how the normative definitions of modernity itself were being manipulated to construct a new "Indian-modern"?

[137] Concrete Association of India. *Designs for Modern Living*, Foreword.
[138] Concrete Association of India. *Designs for Modern Living*, 18.
[139] Concrete Association of India. *Designs for Modern Living*, 14.

At particular instances the journal advocates for the use of concrete for both the structure and its various finishes, from paving courtyards with "concrete flagstones" to decorating the interior of the home with colorful "cement paints".[140] Concrete was marketed as the 'be-all and end-all' solution to the construction of the Indian modern home and was advertised as the *only* material the consumer would need, from the pouring of the foundation to the application of its interior finishes. These journals attempted to showcase not only the versatility of concrete as a material but also its indivisibility from the final product. In most instances, the plans and three-dimensional views substitute for the literal mention of the material. But it becomes all but evident to the reader that this new home must be built of the only material capable of achieving these large open spans and slender walls: concrete. Interchangeable terminology, manipulation of spaces, and the coalescence of new in-betweens characterize the pages of these journals. All the while, concrete manages to morph and transform itself to take shape in these envisioned hybrids.

McGowan analyses these journals alongside other pattern books published during this time to trace the interlinked relationship between how the Indian home was marketed by professionals and the shifting consumer identity developed by the Indian homeowner.[141] However, it is concrete that serves as a bridge from imagination to constructed reality for these aspiring homeowners. To build in concrete was to be a 'modern' global citizen. The ambiguity of meaning afforded by concrete as a material allowed its owners to fashion a home that resonated with unique personal and familial values. But above all, it was the notion that building a concrete home was a step up the social ladder that was the driving focus of this desire. For while these journals were publishing designs for homes, they were also promoting the lifestyle these homes would afford their inhabitants. In *Designs for Modern Living,* we see images interspersed with or

[140] Concrete Association of India. *Designs for Modern Living*, 14.
[141] McGowan, "Consuming the home."

foregrounding families and individuals engrossed in domestic activities (Fig.17). A majority of these scenarios, however, depicted scenes of leisure and entertainment, directing the reader to not only the kinds of activities this lifestyle could afford, but also how someone in this lifestyle might look and behave. It is evident that these journals depicted more lavish homes and a life than could be afforded by the average middle-class homeowner. However, the goal of the later publications had already shifted from realization to aspiration. As McGowan notes, these publications no longer offered just practical knowledge on building a concrete home but also the "dreams of what a house *could be*", albeit with additional resources such as money, space, and time.[142]

Marketing the 'Modern' in India: The "Modern Village"

During this same time, a sub-section of these journals turned their gaze elsewhere, towards the country's rural settlements, or "the village".[143] Institutional visions for the modern nation stretched beyond the urban middle class. At a time when the majority of the Indian population was living in rural settings, it became essential to extend this vision to the rural reaches of India.[144] As a result, CAI also published journals that proposed blueprints and examples for fully fleshed "modern" villages. In a 1960's publication, titled *Our Villages of Tomorrow*, we are greeted on the opening pages with an elaborate master plan employing radial symmetry and marking an ordered distribution of infrastructural facilities. The editorial note states that the villages of "to-day" must be "rebuilt to look clean and attractive".[145] On the

[142] McGowan, "Consuming the home,"151.
[143] Library Catalogue, National Library of India (Kolkata, India), accessed May 2022.
[144] Records indicate that the rural population of India comprised 80% of the demographic in 1951. Chandramouli, "Rural Urban Distribution of Population",19.
[145] Concrete Association of India. "The Kind of Villages We Want," in *Our Villages of Tomorrow* (Bombay. 196(?)), 1.

following page, the editor directly addresses the" village planner" and the "rural architect", calling them to employ concrete and cement construction for the realization of this vision.[146] In a 1968 reprint titled *Modern Village*, we are now provided with an additional three-dimensional watercolor rendering of this masterplan, complete with bullock-drawn carts on concrete paved streets and agricultural fields dotting the horizon (Fig. 18). These publications go into further detail promoting the advantages of building with concrete over local materials and conventional methods. Strength, durability over time, order, and sanitation are often touted as its outcomes.

Both publications mentioned above provide detailed designs for every aspect of this modern village. The breadth of designs includes individually owned structures, such as houses, communal facilities, such as community wells and cattle sheds, larger public infrastructure such as bus stations and roads, and even discrete elements, such as flower boxes and steps. On the construction of the concrete home, it recommends a concrete structural foundation and a superstructure built with concrete hollow blocks made on site. An interior view of the home shows details all finished in concrete and cement – from an inbuilt concrete *chulha* (stove) platform to concrete *jallis* (patterned and perforated window screens) (Fig.19). The text denotes using concrete to "brighten" the interiors and to achieve a "neat and tidy" appearance.[147] The aspirations for the modern village extend beyond the individual, with multiple pages allocated to designs of public buildings like bus stations and village markets. These journals position themselves differently compared to the ones marketed towards the middle-class consumer and are acutely aware of the socio-economic differences separating their audiences. While the former journals were designed with lavish furnishings, the latter section uses inbuilt architectural elements like the *chulha* or the *jalli* to reduce costs and in keeping with rural domestic practices.

[146] Concrete Association of India. *Our Villages of Tomorrow*, 2.
[147] Concrete Association of India. *Our Villages of Tomorrow*, 2.

A section of these journals shows depictions of before and after conditions, moving from disorganized, poor living conditions to orderly and sanitized ones. In a sense, these improvement efforts could be understood as an afterlife of the colonial PWD's efforts at organization and standardization of the Indian built landscape. The echoes of its technocratic policies are still evident in these post-colonial practices. For example, one image shows water and waste drainage canals before and after the installation of concrete creteways (Fig. 20). Another image shows the replacement of an informal market with one organized in and around concrete stalls and concrete roads (Fig. 21). It is hard to corroborate the validity of these comparisons. Are these the same sites in the same village? Across what duration were these two images captured? And are they reflective of the larger built landscapes of Indian villages of the time? Current day visits to similar sites will both attest and contradict these examples. Indian villages have long grown, urbanized, and even concretized, but neither are they uniform in their built characteristics nor in their levels of concretization.

Compared to the elusiveness of the previous publications, this particular set of journals mentions the use of cement and cement concrete every step of the way. It is advocated throughout, as almost the perfect material, suitable to the modernization cause for the "ideal village". When assessing what qualities, the material that fulfills this vision should possess, the journal mentions that the material should be first and foremost, inexpensive. It must also be durable in response to various factors, easy to handle, and able to lend itself to the construction of varying types of structures.[148] The answer to these questions, according to the journals was resoundingly cement and concrete. We find the following words in an introductory passage of the journal, *Our Villages of Tomorrow*:

[148] Concrete Association of India. *Our Villages of Tomorrow*, 2.

> Today the village planner, the rural architect and builder turns unhesitatingly to Cement and Concrete as the ideal media for every type of rural construction. Here are materials which not only fulfil the conditions specified but actually surpass them. Concrete grows *stronger* with age, not weaker.[149]

The fact that the journals were written and published mainly in English, begs the question, towards whom were these manuals targeted? Unlike the earlier journals, which catered directly toward the urban middle class, this series of publications offer advice to the "village planner", or by extension, to government officials. There is a different bias of agency or lack thereof towards the aspiring rural homeowner. Within the Indian context, concrete became malleable to advocate for the messaging suitable to the cause.[150] The modern-chic lifestyle in the wealthy urban context is juxtaposed with the modern yet "low-cost" in the rural and semi-urban contexts. The ambitious urban and the aspiring rural were, in fact, marked characteristics of rapidly urbanizing India. Of all building materials, concrete mimicked this unique duality. The industry was attuned to capitalize on this dynamic and to cater to tastes across class and geography within the national context.

These institutions were able to redirect their advertising and goals on the basis of their shifting consumer market. As the anonymous author of the introduction of this journal admits, catering to the Indian homeowner meant having to also cater to the nation's rural residents.[151] The "development" of the nation depended on it.[152] In this way, cement and concrete institutions continuously recalibrated their outreach measures to encompass broader and more varied

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[149] Concrete Association of India. "Moving in the Right Direction," in *Our Villages of Tomorrow* (Bombay. 196(?))
[150] Forty, *Concrete and Culture*.
[151] Concrete Association of India. *Our Villages of Tomorrow.*
[152] Concrete Association of India. *Our Villages of Tomorrow*.

consumer bases. With each recalibration, their intentions were conveyed through carefully curated design recommendations.

An overwhelming class-based tension underrides these publications. Concrete was seen as the material to build an aspirational, upper-class, and urbane home but it was also capable of constituting an inexpensive, fundamental, rural home. Forty discusses this as one of the reasons why concrete never fully became popular in developed nations and why it was embraced by the Global South, given its inherent class ambiguity.[153] Concrete was and continues to be both expensive and inexpensive, modern and crude, aspirational and functional.

Multiple scholars in the field have discussed in length the prominent architectural landmarks that dominated this period and have traced the trajectory of modern Indian architecture alongside the legacies of prominent Indian and foreign architects whose work defined the field and period. A majority of these projects were constructed in concrete, from Le Corbusier's Legislative Assembly in Chandigarh to Raj Rewal's Hall of Nations Pavilion, from Correa's high-rise towers to his more modest housing complexes. Significant scholarship records the varying government housing projects and experiments that were executed in major Indian cities that helped to shape housing practices in those regions. But, simultaneously and in equal if not broader measure, the average Indian homeowner was using concrete to build homes and claim a stake in the modern architectural narrative of India.

While pointing towards the endorsement of concrete by institutions with vested interests, a close reading of these journals also enlightens us about the developing aesthetics and values of the Indian consumer of this distinct period. A majority of these journals were sold for a price of one to five Indian rupees, a relatively affordable price for a middle-class reader. Marketed in a

[153] Forty, *Concrete and Culture*.

style of "popular" media, these books themselves became objects of consumption and entertainment.[154] They offer us a snapshot into a particular moment in time within the Indian building industry and a reflection of a more widespread evolving national and individual identity - the wants and needs of the newly independent Indian homeowner and the shifting architectural profession.

[154] McGowan, "Consuming the home," 155-156.

Conclusion: Concrete Imaginaries

'A Family Home', 2018 - present. Mangalore, India.

(Photograph by author. Not to be reproduced)

In her book, *The Enchantment of Modern Life*, Bennett addresses the human "affect" derived from interactions with the everyday world, including both natural and cultural products and how things can either invoke "delight or disturbance" in the human psyche.[155] This idea governed the preceding discussions in this thesis on concrete as a building material while addressing the duality that it possessed to invoke both ends of this spectrum of human response. In *Vibrant Matter*, Bennett poses the guiding question of how political responses to public problems might differ in society if the "vitality" of nonhuman bodies were to be considered seriously.[156] In the same vein, this section of the thesis poses a similar question: how would architectural responses to spatial problems differ in the field were the "vitality" of nonhuman agents - the very building blocks of the field - be considered seriously? *Vitality,* for Bennett, is the capacity of things to present themselves as quasi-agents or forces, with their own trajectories and tendencies.[157] Bennett focuses her attention on the agency of things to affect their surroundings. This very "affect" is equated to their materiality – a vital materiality that is intrinsic and active.[158]

Bennett describes this ability of things or materials to exert force as "thing-power".[159] This framework is influenced in part from Baruch Spinoza's idea of "conatus", Henry David Thoreau's encounter with the "wilderness", and Hent de Vries' idea of "the absolute".[160] *Thing-power,* for Bennett, is the "curious ability of inanimate things to animate, to act, to produce

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[155] Bennett draws on Spinoza's description of affect – the "capacity of any body for activity and responsiveness." Jane Bennett, *The Enchantment of Modern Life: Attachments, Crossings, and Ethics* (Princeton, N.J.: Princeton University Press, 2001), xii.
[156] Bennett, *Vibrant Matter*, Preface, viii.
[157] Bennett, *Vibrant Matter*, viii.
[158] Bennett, *Vibrant Matter*, viii – xiii.
[159] Bennett, *Vibrant Matter*, 1-4.
[160] Benedictus de Spinoza, Samuel Shirley, and Seymour Feldman. *The Ethics and Selected Letters* (Indianapolis: Hackett Pub. Co, 1982); Henry David Thoreau and J. Lyndon (James Lyndon) Shanley, *Walden* (150th anniversary ed. Princeton, N.J.: Princeton University Press, 2004); Hent de Vries and Lawrence Eugene Sullivan, *Political Theologies: Public Religions In a Post-secular World* (New York: Fordham University Press, 2006), 1-88.

effects dramatic and subtle."[161] The framework of vital materialism doesn't claim equivalence between humans and things, nor does it seek to discredit the impact of human actions. It instead aims to redistribute the place that humans occupy at the ontological center.[162] Within the narrative of this thesis and the evidentiary sources referenced, is concrete the subject or the object? The desire is not just to own a home, but within this specific context, to own a *concrete home*. While an entire subsect of architectural historians and scholars have dissected the ontological origins and conception of the "home" or "house", the equally important other half that makes up this architectural entity has received less scholarly and cultural attention.

Within the journals we see that utilizing concrete offered the promise of stability, permanence, and even sanitation - stability in its ability to withstand the elements of nature, which in turn provided a sense of permanence - of being rooted in place. In his Master's thesis, "(De)Constructing Concrete: Meaning and Materiality in Postcolonial India", author Siddharth Menon notes the shift in rural and urban construction practices in India, as what he dubs, from a "*kuccha* to *pucca*" process.[163] Both these terms, still widely used across the Hindi-speaking regions of India even today, describe the difference between the two prevalent types of regional building construction. '*Kuccha'* in its most direct Hindi translation means "raw" or "uncooked". When used in the context of building construction, it refers to structures that are in a state of impermanence, usually built with local materials that require regular repairs and maintenance. These include structures built of traditional materials such as bamboo, wood, mud, and even stone. The term *'pucca'*, on the other hand, means "sure" or "solid" and in the context of

[161] Bennett, *Vibrant Matter*, 6.
[162] Bennett, *Vibrant Matter*, 10-11.
[163] Siddharth Menon, "(De)Constructing Concrete: Meaning and Materiality in Postcolonial India", Master's Thesis (Department of Geography, University of Colorado. 2018).

construction translates to structures that are perceived to be more permanent. The term *pucca* or *pukka* (as its alternatively spelled) was also popularized by its British imperial use in India. Borrowed from native speakers, its connotations with "sound" and "solid" were adopted to mean "genuine". Instances of such usage included defining the quality of construction to be good, or 'pukka'. Interestingly, in common parlance, building a *pucca* house has now become almost synonymous with the construction of a *concrete* home.

Variations of these terminologies exist across the other numerous regional and ethnic languages in India. In addition, an English version also exists: the "slab" house. The "slab" house refers to the distinction between a house with a (concrete) "slab" and one without. Once again, the material in question is never stated, but is implied as being concrete. A slab house in Western contexts denotes a house built on a concrete slab foundation, which is typically four to six inches thick in cross-section. References to the slab house in the Indian context, however, often allude to the slab overhead. There are three interpretations attached to this overhead slab that I wish to extrapolate. The first is the slab as a structurally sound roof, the second is the slab as a terrace, and lastly, the slab as a symbol of *possibility*.

Houses made from traditional building materials often had roofs that needed seasonal maintenance. A concrete slab over the home meant freedom from continual repairs and the uncertainty of shelter that came along with it. Sentimentally, this draws on one of the fundamental principles of the home: a roof over one's head. Besides the structural promises of concrete as a material, its inhabitants interact with the concrete home as a space of shelter and surety. Does the concrete home in turn reassure them? I believe this assurance is also a force exerted due to the nature of its *thing-power*. It is important to begin to put words to these

reactions because the interactions made possible within the *pucca* concrete house are different from that of those experienced within the vernacular *kuccha* house.

Having a structurally sound concrete slab roof also meant that it could serve as a spatial extension of the home. Across India, these roof terraces become crucial domestic living spaces. They become sites of work, leisure, and even sleep. For a nation as populous as India, and a country with some of the highest urban densities, a home with a concrete slab roof provides additional space that is highly valued and multi-purpose in its use. Often, these roof terraces begin to fill the functional voids created by the modern home itself. Domestic activities, such as large-scale food preparations and line-drying laundry, are common sights on display on terraces (Fig. 22a & 22b). In more arid regions terraces also become outdoor sleeping spaces during hot summer months. In more compact urban areas, roof terraces are also used as sites of leisure, providing a space for kids to play or for communal activities. A more prominent example is the use of terrace spaces during *Uttarayan*, the annual kite festival in India. Residents gather on terraces to celebrate the kite flying festival and even engage in friendly competition with neighbors in close proximity. Terraces here stitch themselves together to create a distinct, elevated celebratory social space – a larger assemblage (Fig. 23).

Finally, I turn to the idea of the concrete slab as a symbol of *possibility* for the Indian homeowner. Given the trabeated construction system of concrete, it often becomes easy to extend the structure vertically in future additions. The columns are projected, reinforcements tied in, and a new story added. This feasibility was in keeping with the growing socio-economic aspirations of the growing middle-class homeowner - the possibility to own a bigger home. While this may not strike as a novel concept, it is important to recall that prior generations of homeowners had likely lived in homes constructed out of traditional materials and techniques.

Many of these houses would have been load bearing and designed to fulfill only the needs of the time. Hence, adding additional floors to these houses was not only structurally unfeasible, but also not something that was imagined often. Morton describes the construction of the concrete home in Mozambique as an ongoing project [164] - one that is never fully completed like the post-colonial national identity.

The building of a home may seem like a private enterprise, but unlike other products of consumption, it is realized in the visibility of the public domain. Morton notes that by nature of the material qualities and construction techniques, houses – "their tangibility, their visibility, their relative fixedness" - all make their construction a public act.[165] Spinoza's framework of *conatus* (conative bodies) dictates that it is also "associative" - it's very existence as a body in a non-vacuum means that it is "continually affecting and being affected by other bodies"[166] – a constituent in an assemblage.

As with Bennett's definition of the assemblage, there was no central governing agent that gave rise to this concrete phenomenon, but, instead, it was the confluence of the distinct emergent properties of all the constituents that was felt and in turn reacted upon.[167] Equally important to note is that the way and degree to which these emergent properties were experienced is also a result of the "agency *of* the assemblage". This differs from our preconceived understandings of a grouping to be a sum total of its parts. Instead, each assemblage is distinct, and the emergent properties of its various constituents are continuously acting and being acted upon by its fellow constituents in the assemblage.

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[164] Morton, *Age of Concrete*, 22.
[165] Morton, *Age of Concrete*, 17.
[166] Baruch Spinoza, *The Ethics and Selected Letters*, cited in Bennett, *Vibrant Matter*, 21.
[167] Bennett, *Vibrant Matter*, 24.

Within this framework of assemblage, at a material level, every mix of concrete is then inherently different. From its parts, the cement and steel that is manufactured, and the water and aggregate that gets locally sourced, to its mixing, where each ratio is different - from the ratio of cement, sand, water, and aggregate - to the ratio of concrete mix to steel reinforcement in any given built element. To its assembly, prefabricated in climatically controlled factories of mass production versus assembled on site with manual labor of varying skill level and exposed to unpredictable natural elements and weather. At the level of production, we see how the monopolies created by the PWD through their administration and oversight and then the cement companies through their vested interests, created a unique socio-economic and politically driven building industry. The designs of the 'modern' Indian home that were marketed were an assemblage in themselves and were housed, within, and next to multiple other such designs, in an even larger assemblage that was the journal.

A concrete future

Envisioning the Indian concrete home as a variety of complex and unique assemblages, can help us begin to map a broader understanding of the architectural practices of its current and preceding eras. As discussed in Chapter one, we see how the Indian concrete home developed, in part, by its precedent colonial legacies, and partly in response to the concerted efforts by national institutions to decipher and attain a 'situated modern' identity. The institutions of production employed the journals they published as one of the constituent tools to help craft a favorable environment of consumption. The Indian homeowner, with their individual and communal aspirations, sought out the concrete home in a near singular, yet collective national desire. Most historical discussions will name concrete purely as the material that was "chosen" to be molded to these causes. But if anything, this thesis proposes that concrete in late nineteenth and twentieth

century India, and even today, was never a passive material of choice. It equally exerted a magnanimous pull on the imagination of these constituents. It beckoned to be chosen as the instrument, to answer these questions of identity, and fulfill these aspirations. Its *thing-power* is felt in the pages of these journals and in the millions of Indian homes it habituates. Tracing the shifting historical course of concrete also helps us chart the shifting notions of modernity, domesticity, and architecture in India. To even begin to define the Indian concrete home as a singular entity seems like an impossible claim. But a material culture studies approach can help craft a more nuanced discussion of this phenomenon.

There are complex questions of labor, scale, gender, and class that affect the systems of production and consumption of concrete. The purview of this project and my own limitations as a scholar prevented me from engaging with these equally important themes in a more meaningful way. My hope is to build upon this work, or have it built upon, and to expand and enrich its scope of enquiry. Current and future conversations on concrete will invariably have to address issues of sustainability. However, this thesis has attempted to highlight some of the complexities of the modalities of making and building with concrete. Sustainability in and of itself is also a situated parameter. Concrete is inherently neither sustainable nor unsustainable. It is a medium that takes on meaning. Like other topics explored in this thesis, the meanings associated with concrete are derived from the broader cultural landscapes and economies of market it is produced in. As a concluding remark, I invite fellow scholars to investigate their own situated meanings associated with concrete and the built and unbuilt landscapes it shapes.

Illustrations

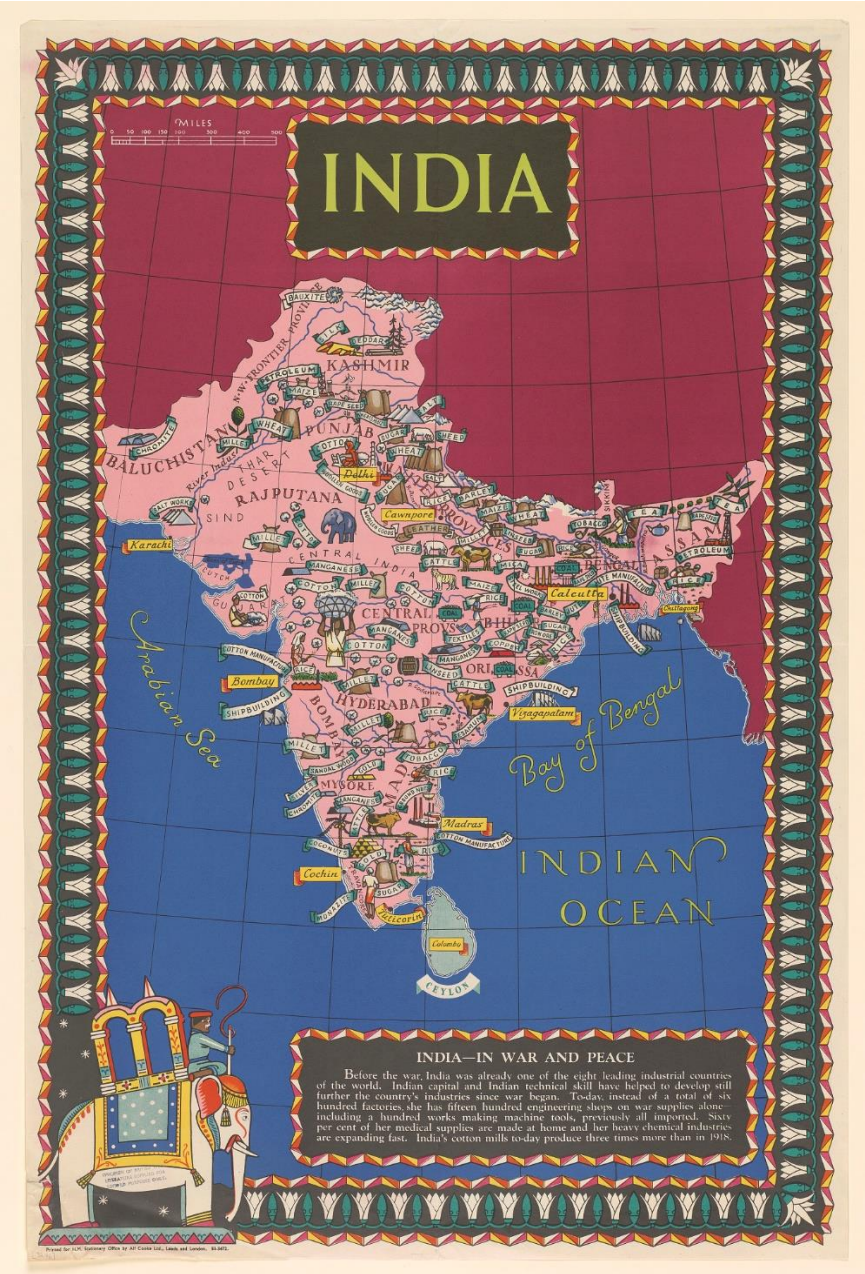


Fig. 01 – Propaganda poster commissioned during WWII titled "India – In War and Peace", depicting 1940's map of British India indicating resources, production of raw materials, and industry in the sub-continent *(This image is a graphical representation only).*

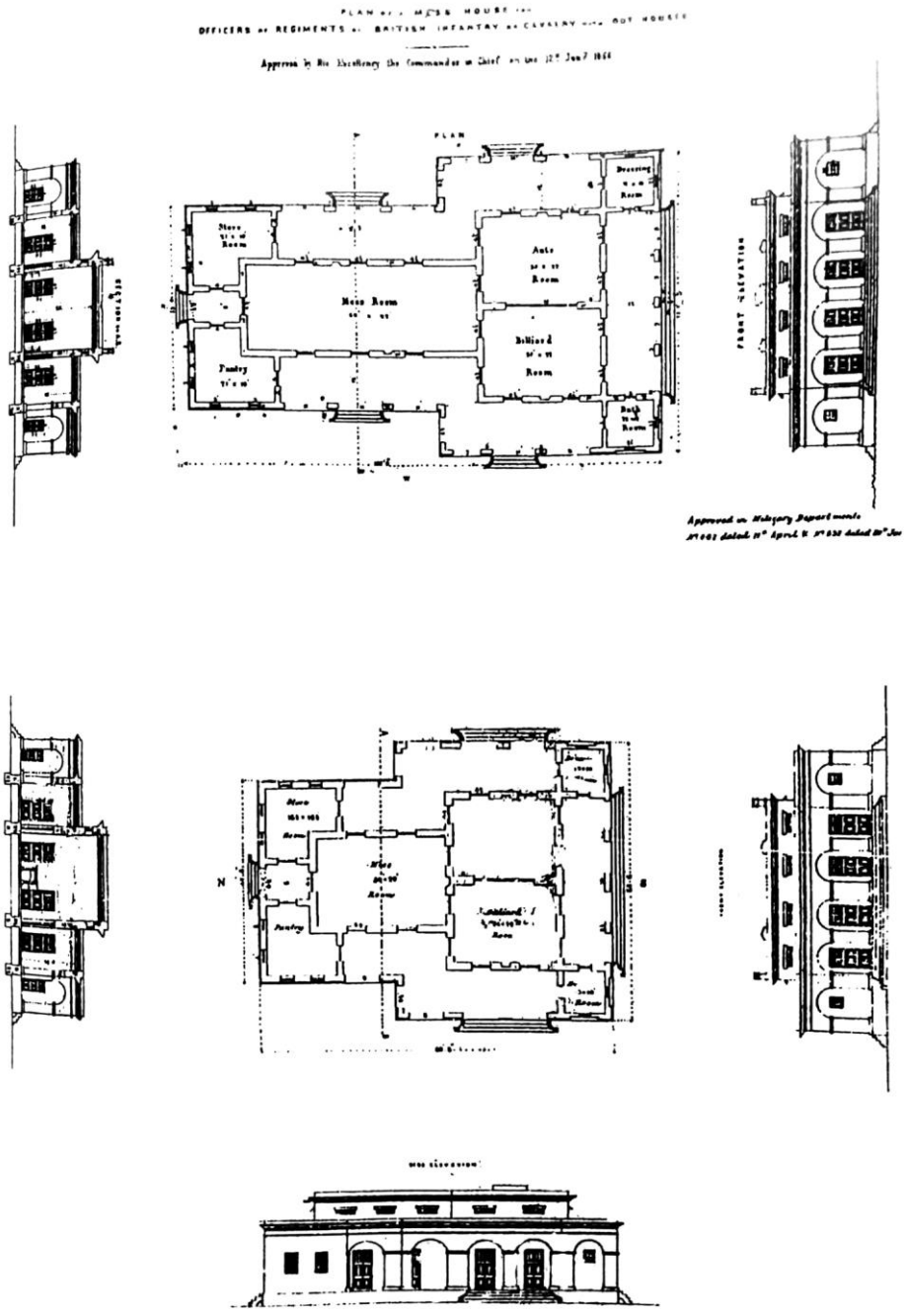


Fig. 03 – Standardized architectural drawings for the officers' mess houses. The "typical" base layout could be parametrically added onto to accommodate British officers while the smaller layout was intended to service native officers.

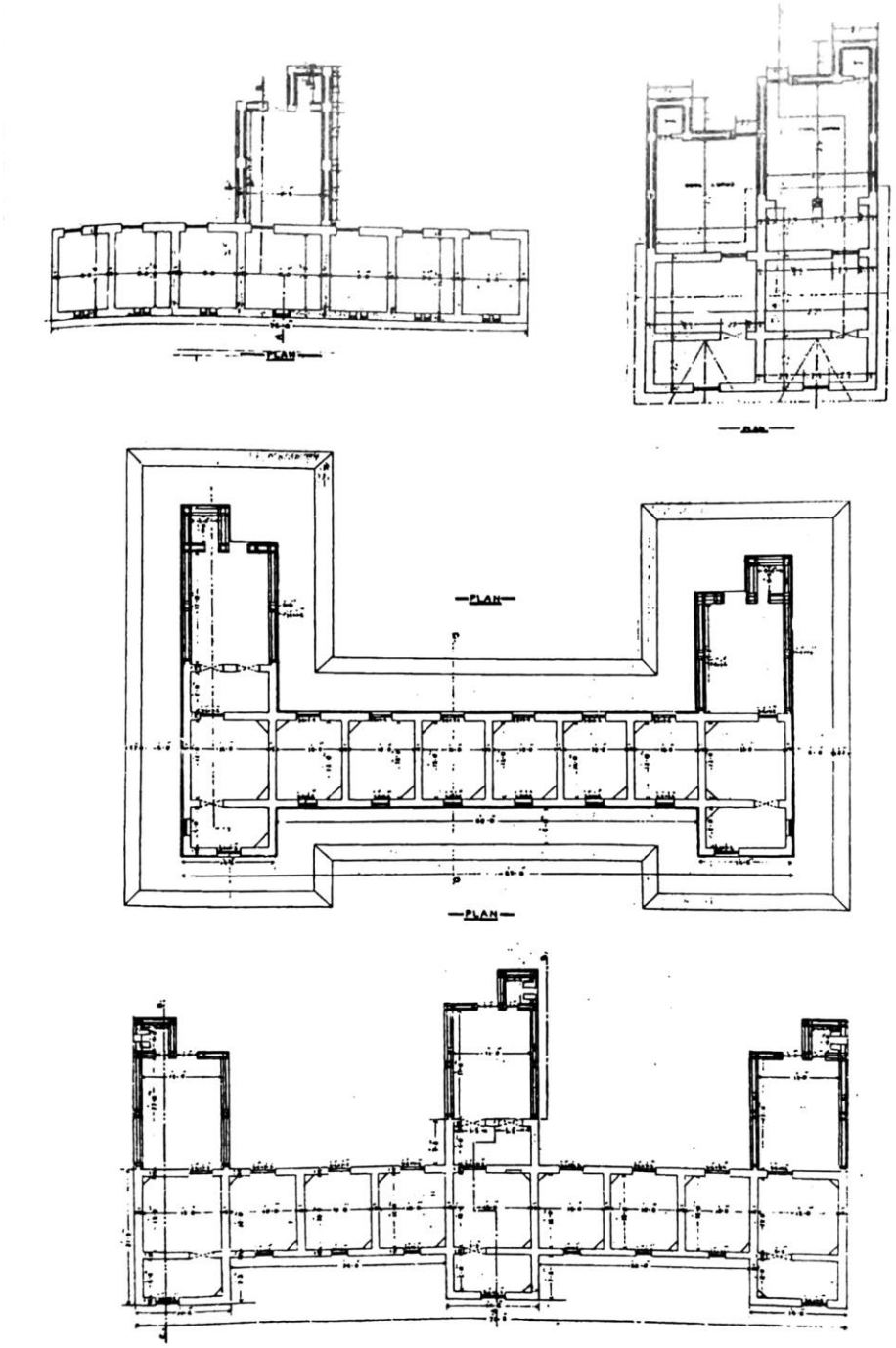


Fig. 04 – Standardized architectural plans for the traffic officers' staff quarters. Tapti Valley Railway, Bombay PWD (Railway Branch). 1899. The largest plan was allocated to the "Station Master" and the smaller plans allocated according to the subsequent hierarchical ranking.

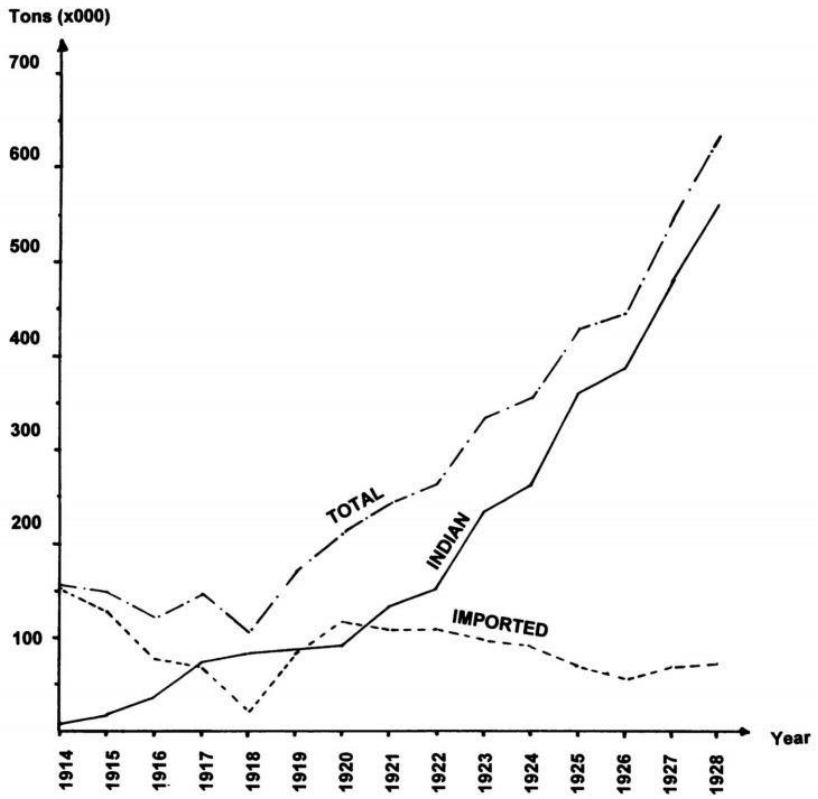


Fig. 04 – Graph showing the change in quantities of imported and Indian-manufactured cement from 1914-1928.

Fig. 05 – Concrete cooling towers of the Sabarmati Thermal Power Station. Ahmedabad. c. 1950.

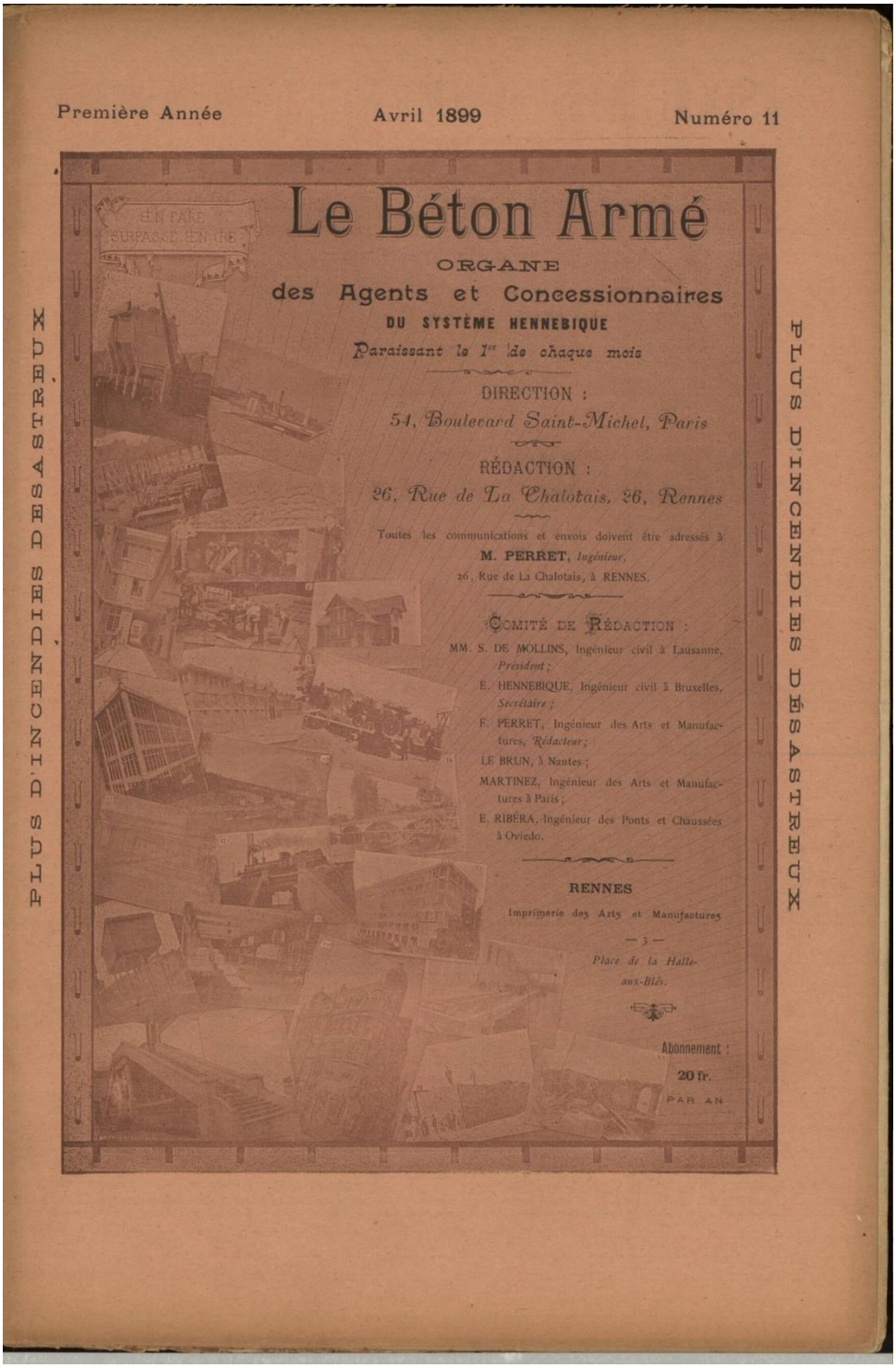


Fig. 06 – Cover of *Le Béton Armé* depicting photographs of projects constructed using the Hennebique system. Published in April 1899. No. 11.

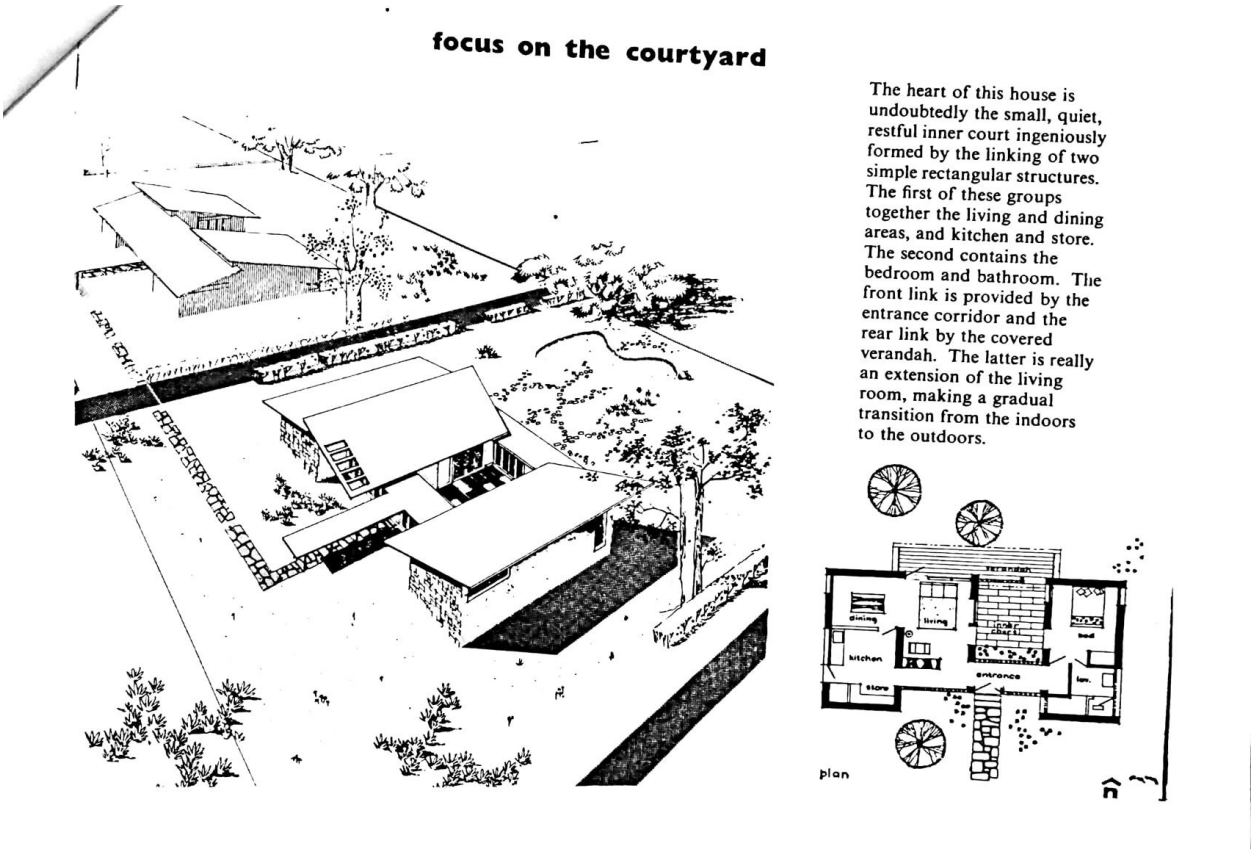
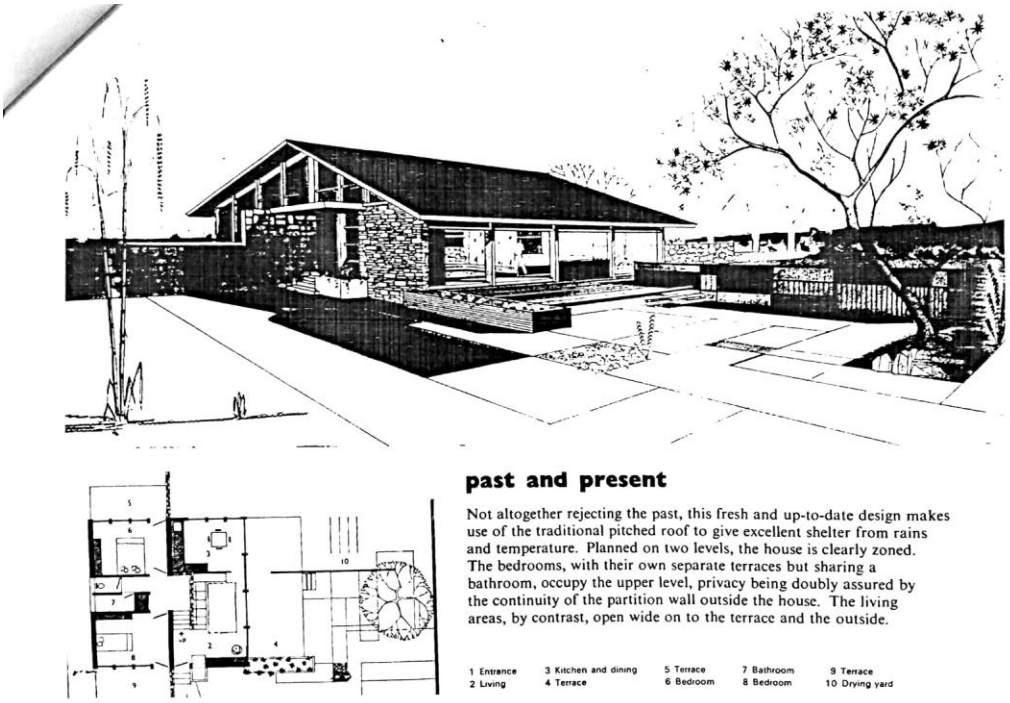


Fig. 07 – View of spread from *Designs for Modern Living*. 1975. Note the prominence of the three-dimensional image on the page versus the plan and accompanying text.

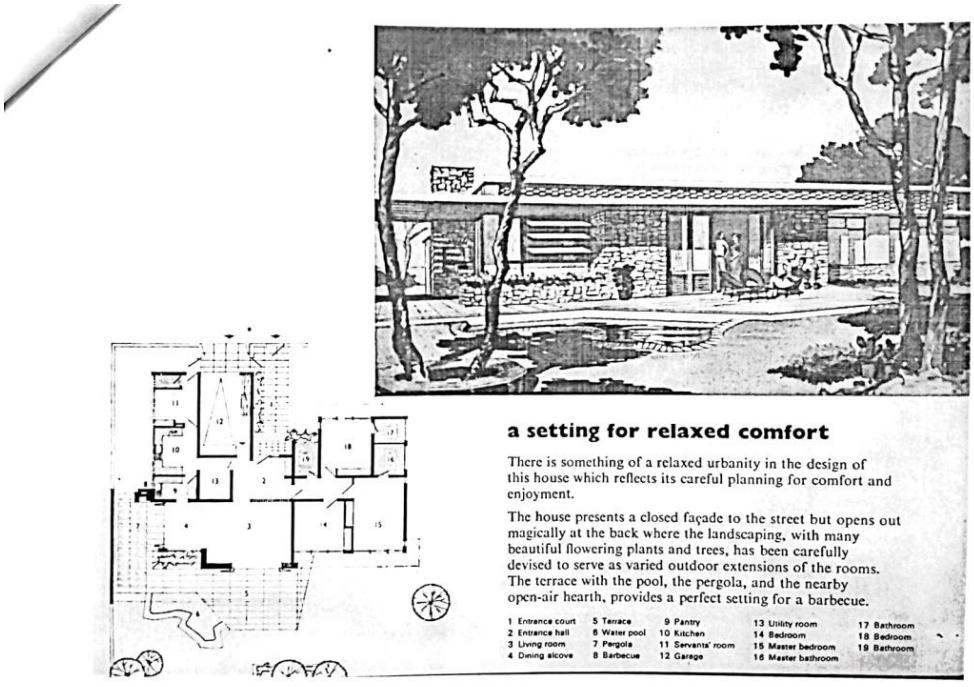


past and present

Not altogether rejecting the past, this fresh and up-to-date design makes use of the traditional pitched roof to give excellent shelter from rains and temperature. Planned on two levels, the house is clearly zoned. The bedrooms, with their own separate terraces but sharing a bathroom, occupy the upper level, privacy being doubly assured by the continuity of the partition wall outside the house. The living areas, by contrast, open wide on to the terrace and the outside.

1 Entrance
2 Living
3 Kitchen and dining
4 Terrace
5 Terrace
6 Bedroom
7 Bathroom
8 Bedroom
9 Terrace
10 Drying yard

Fig. 08 – Journal spread showing a design that states that privacy is “doubly assured” by the continuity of the partition wall.



a setting for relaxed comfort

There is something of a relaxed urbanity in the design of this house which reflects its careful planning for comfort and enjoyment.

The house presents a closed façade to the street but opens out magically at the back where the landscaping, with many beautiful flowering plants and trees, has been carefully devised to serve as varied outdoor extensions of the rooms. The terrace with the pool, the pergola, and the nearby open-air hearth, provides a perfect setting for a barbecue.

1 Entrance court
2 Entrance hall
3 Living room
4 Dining alcove
5 Terrace
6 Water pool
7 Pergola
8 Barbecue
9 Pantry
10 Kitchen
11 Servants' room
12 Garage
13 Utility room
14 Bedroom
15 Master bedroom
16 Master bathroom
17 Bathroom
18 Bedroom
19 Bathroom

Fig. 09 – Journal spread showing a design that is specifically planned for “comfort and enjoyment.”

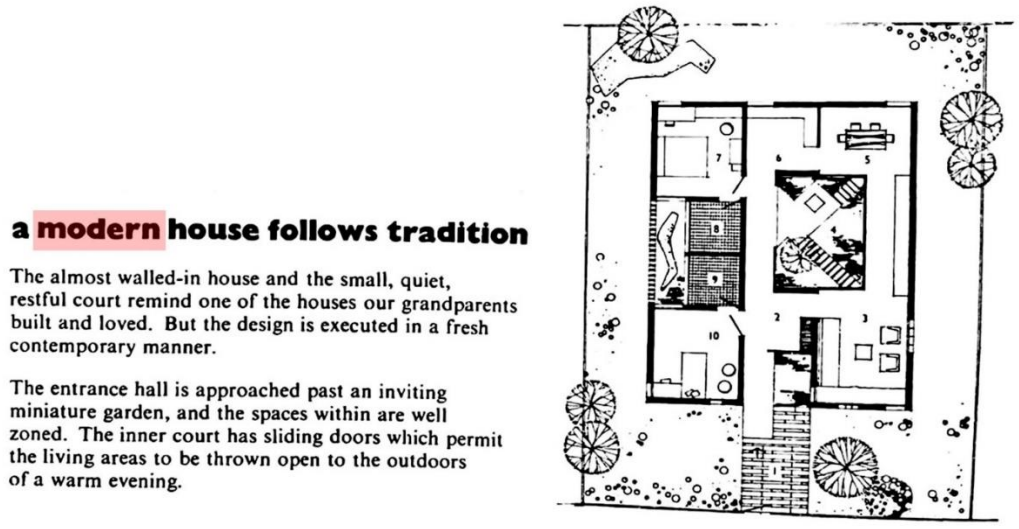


Fig. 10 – Proposed plan from *Designs for Modern Living*. 1975. Notice the title used to describe the design and phrases used in its description. The furnishings used also mimic a "modern" aesthetic. Image edited by author.

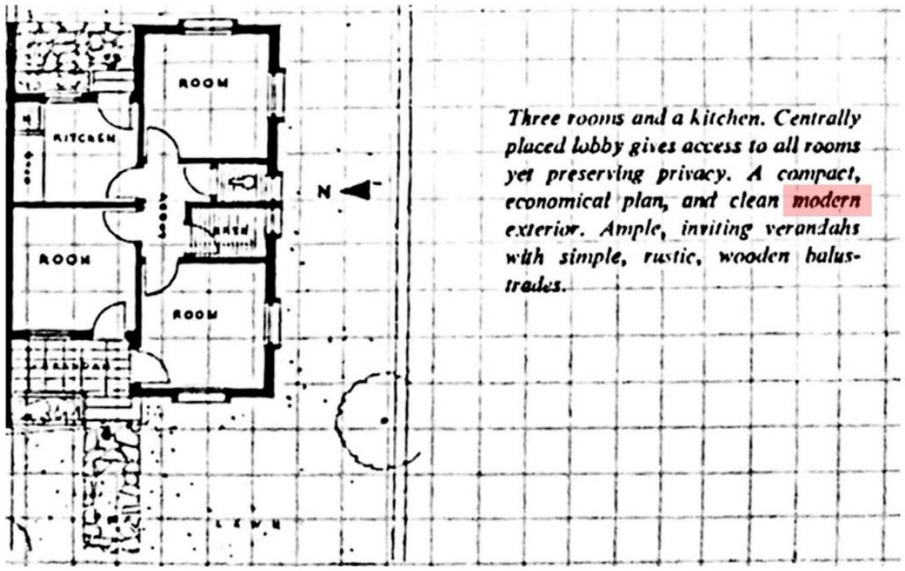


Fig. 11 – Proposed plan from *40 Designs for Low-cost houses*. Reinforcing a "modern" yet "rustic" aesthetic. Image edited by author.

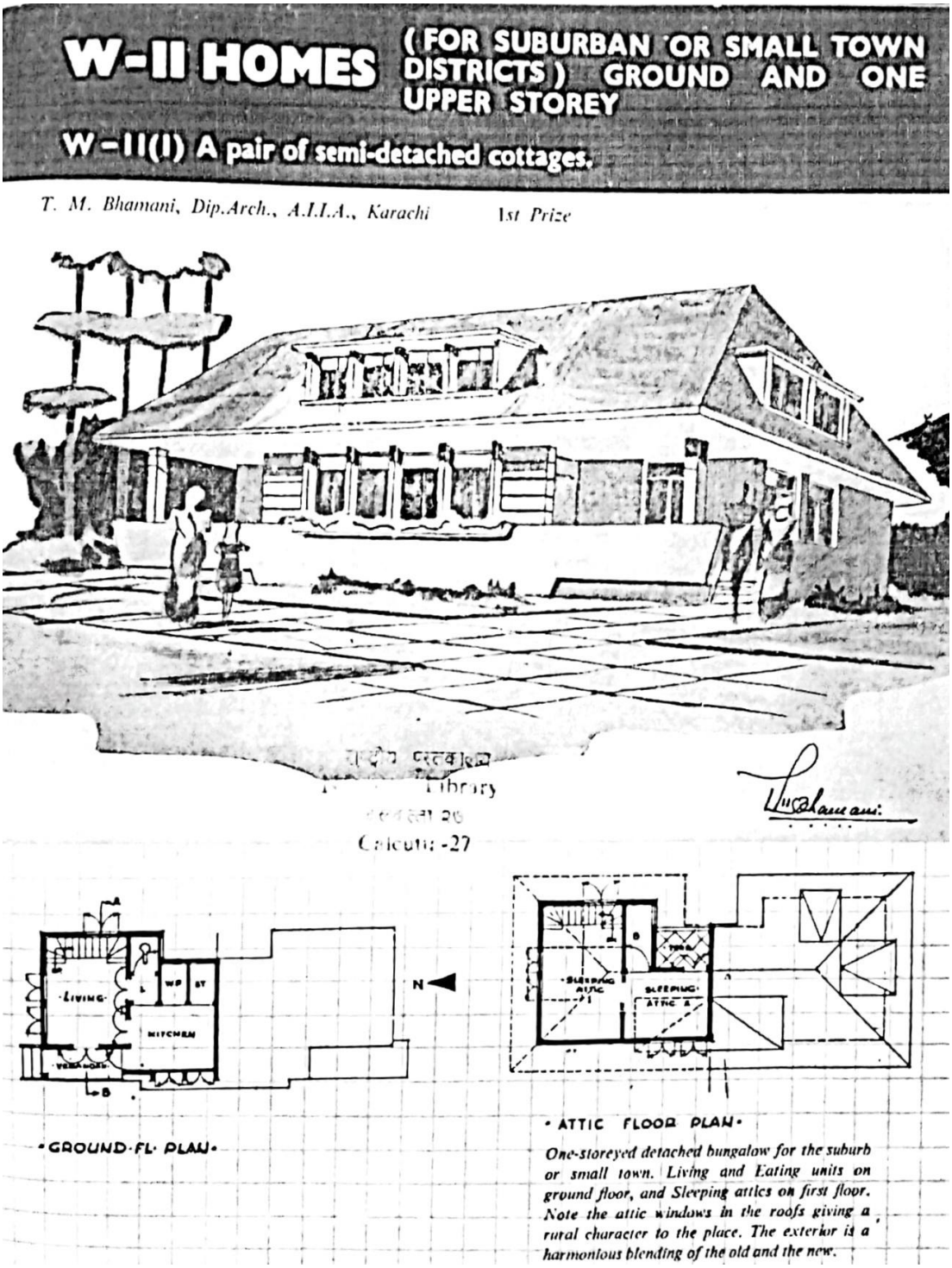


Fig. 12 – View of spread from *40 Designs for Low-cost Houses*. Note the prominence of the familiar roof form as the defining architectural element – but executed in concrete.

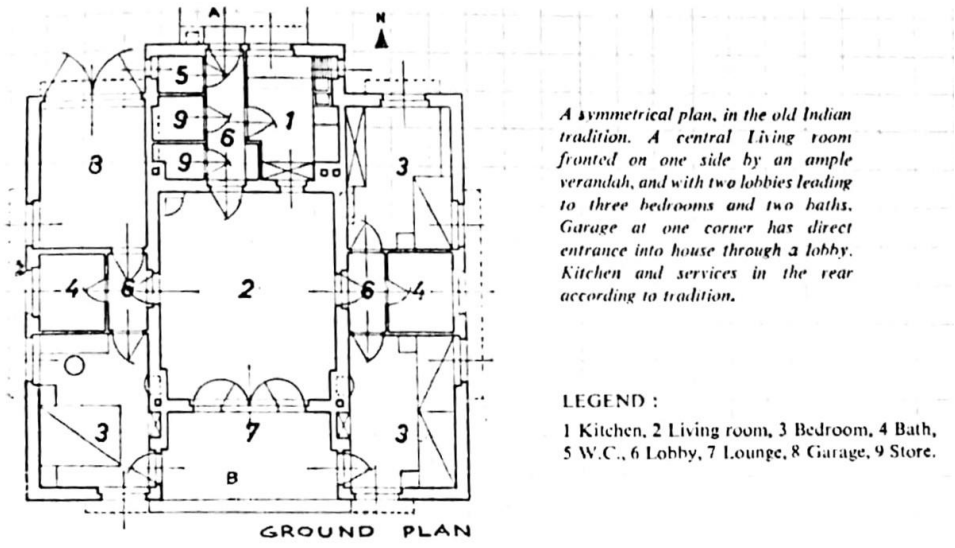


Fig. 13– Proposed plan layout from *40 Designs for Low-cost Houses*. Note the description used, highlighting "traditional" rear service spaces.

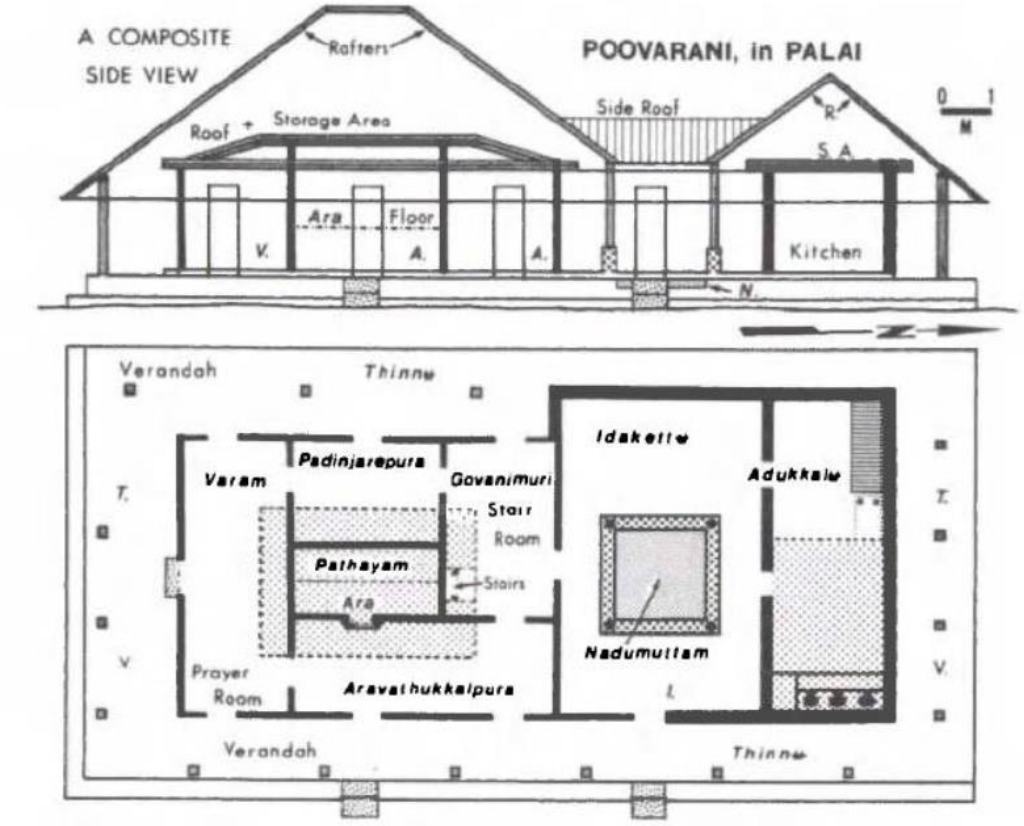
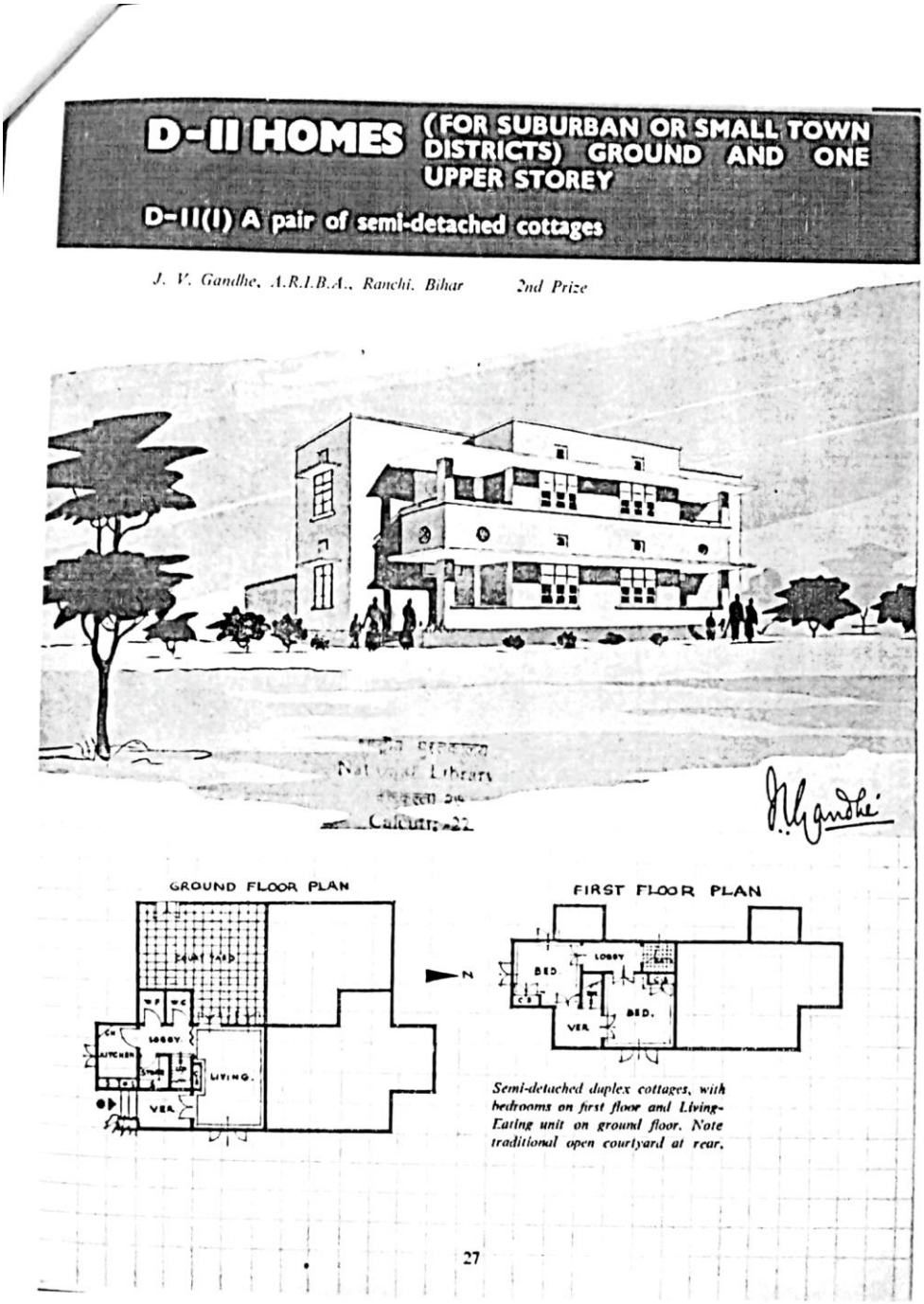


Fig. 14 – Layout of one of the typical traditional courtyard houses in Kerala, India.



D-II HOMES (FOR SUBURBAN OR SMALL TOWN DISTRICTS) GROUND AND ONE UPPER STOREY

D-II(I) A pair of semi-detached cottages

J. V. Gandhe, A.R.I.B.A., Ranchi, Bihar *2nd Prize*

GROUND FLOOR PLAN

FIRST FLOOR PLAN

Semi-detached duplex cottages, with bedrooms on first floor and Living-Eating unit on ground floor. Note traditional open courtyard at rear.

Fig. 15 – Journal spread showing a design for “suburban or small town districts”. The plan is provided for a duplex, for a client assumed to be of higher economic capabilities.

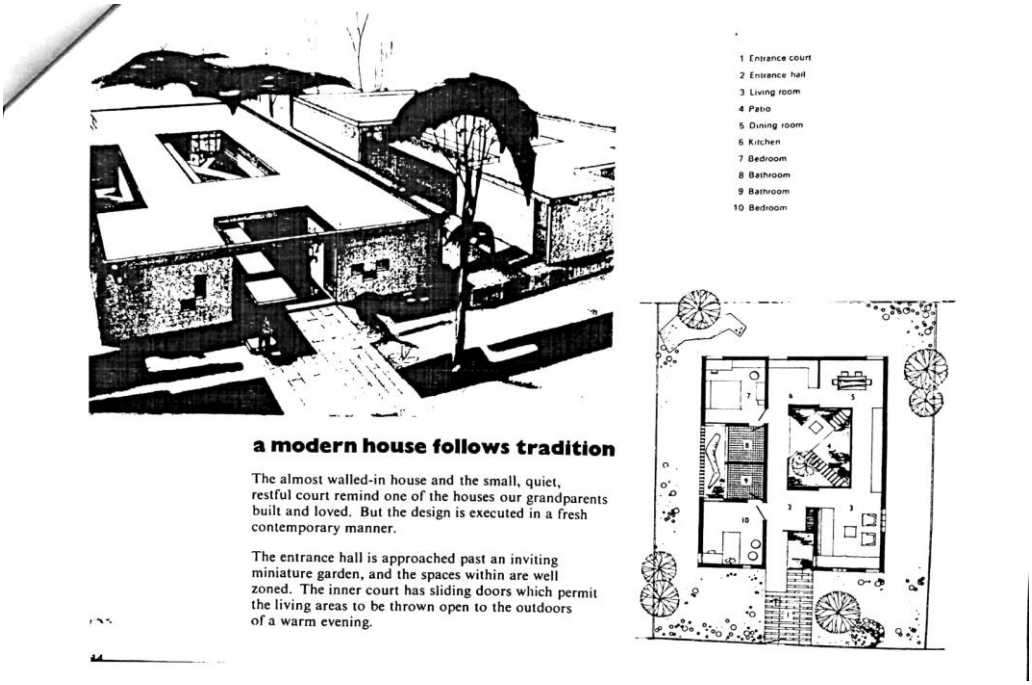


Fig. 16 – Journal spread showing a design inspired by the traditional courtyard plan. The description asks the reader to draw parallels with the typologies of their "grandparents" homes to evoke a sense of familiarity.

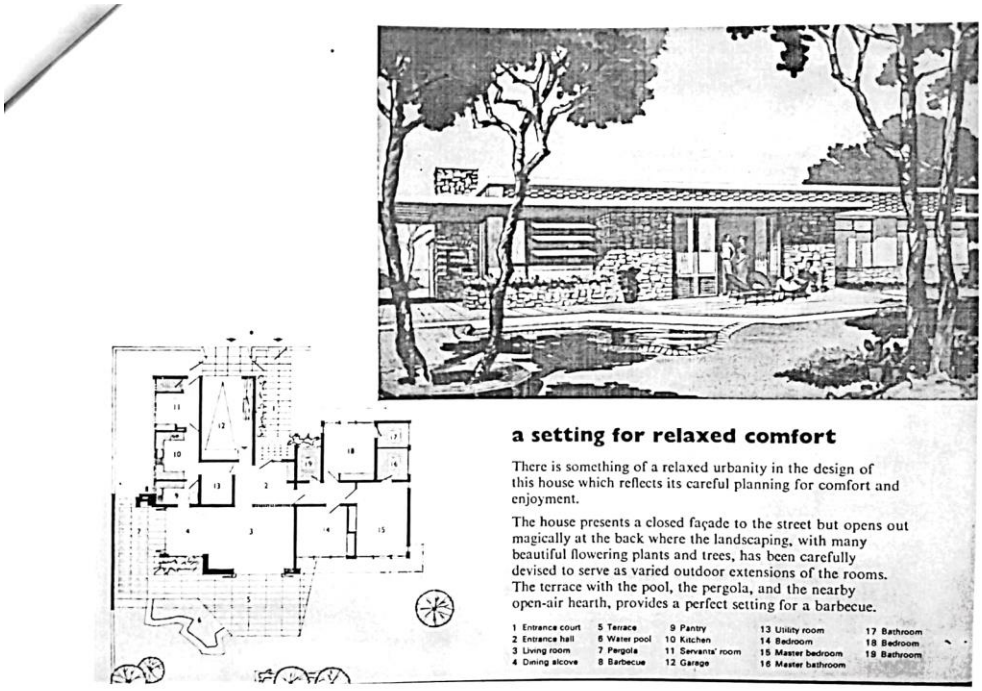


Fig. 17 – Figures in the foreground are engaged in leisurely activities. Journal spread is titled "a setting for relaxed comfort."

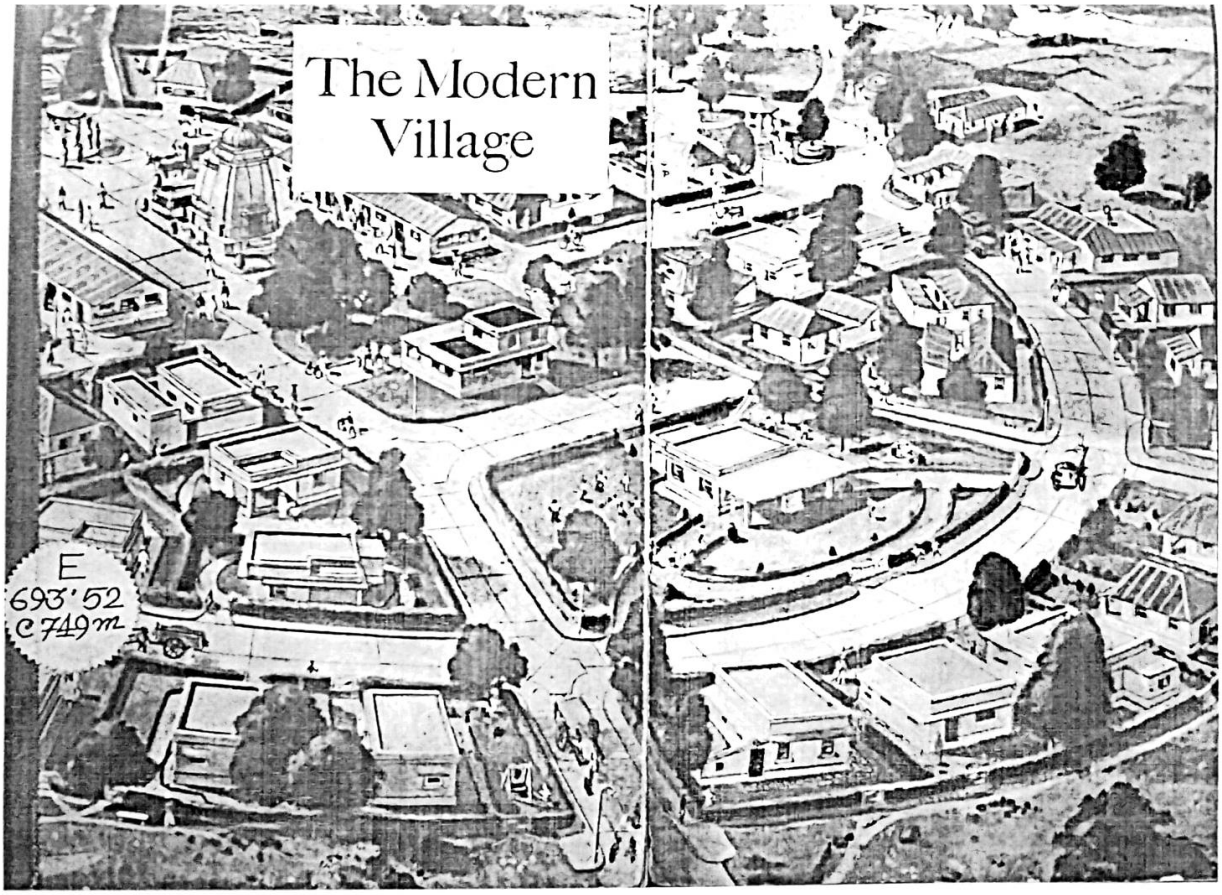


Fig. 18 – Cover page of *The Modern Village* depicting a proposed community level plan, with concrete paved roads and various community structures designed in concrete construction.

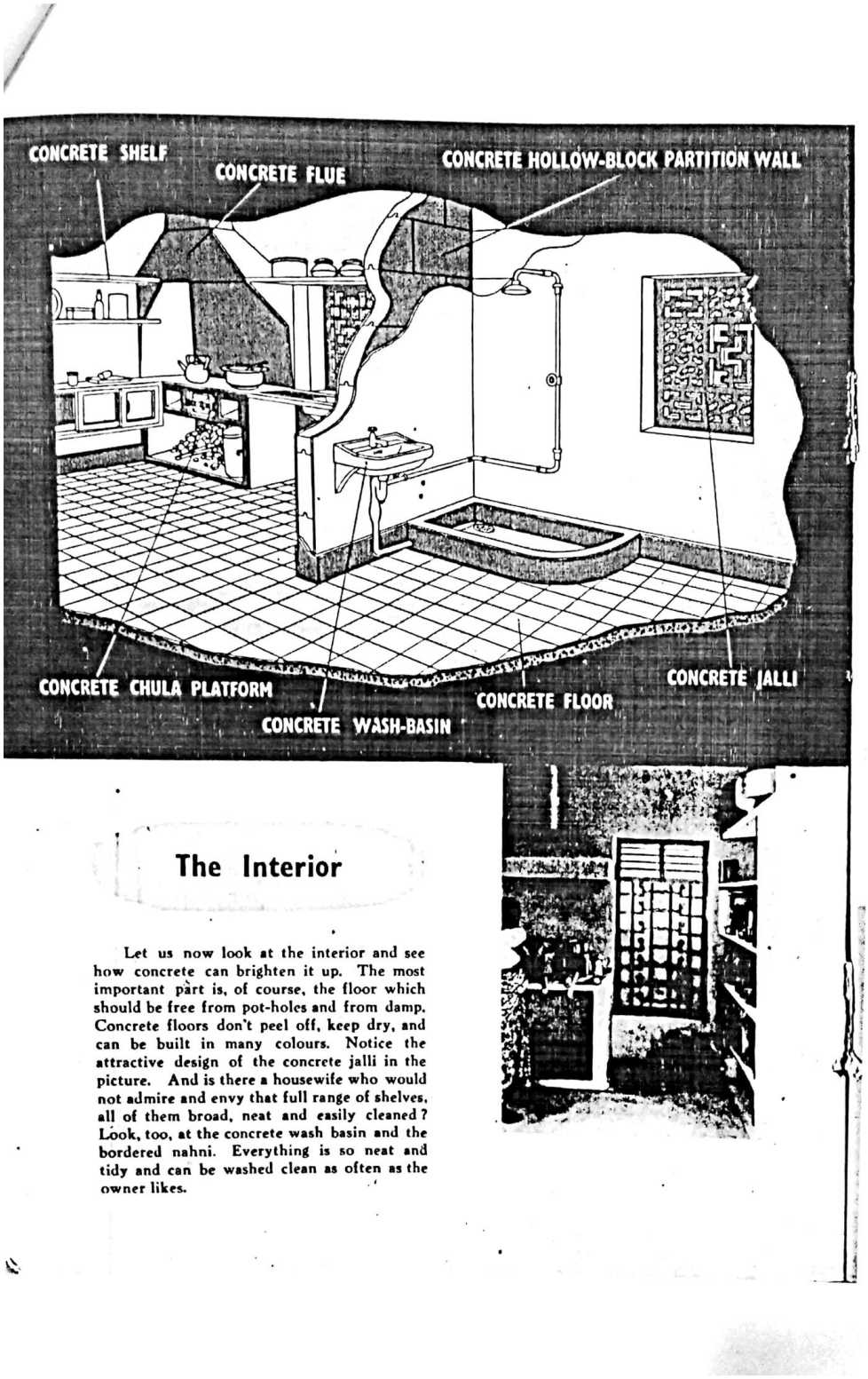


Fig. 19 – Spread detailing the multiple applications of concrete to furnish the interiors of the rural home. From *Our Villages of Tomorrow*.

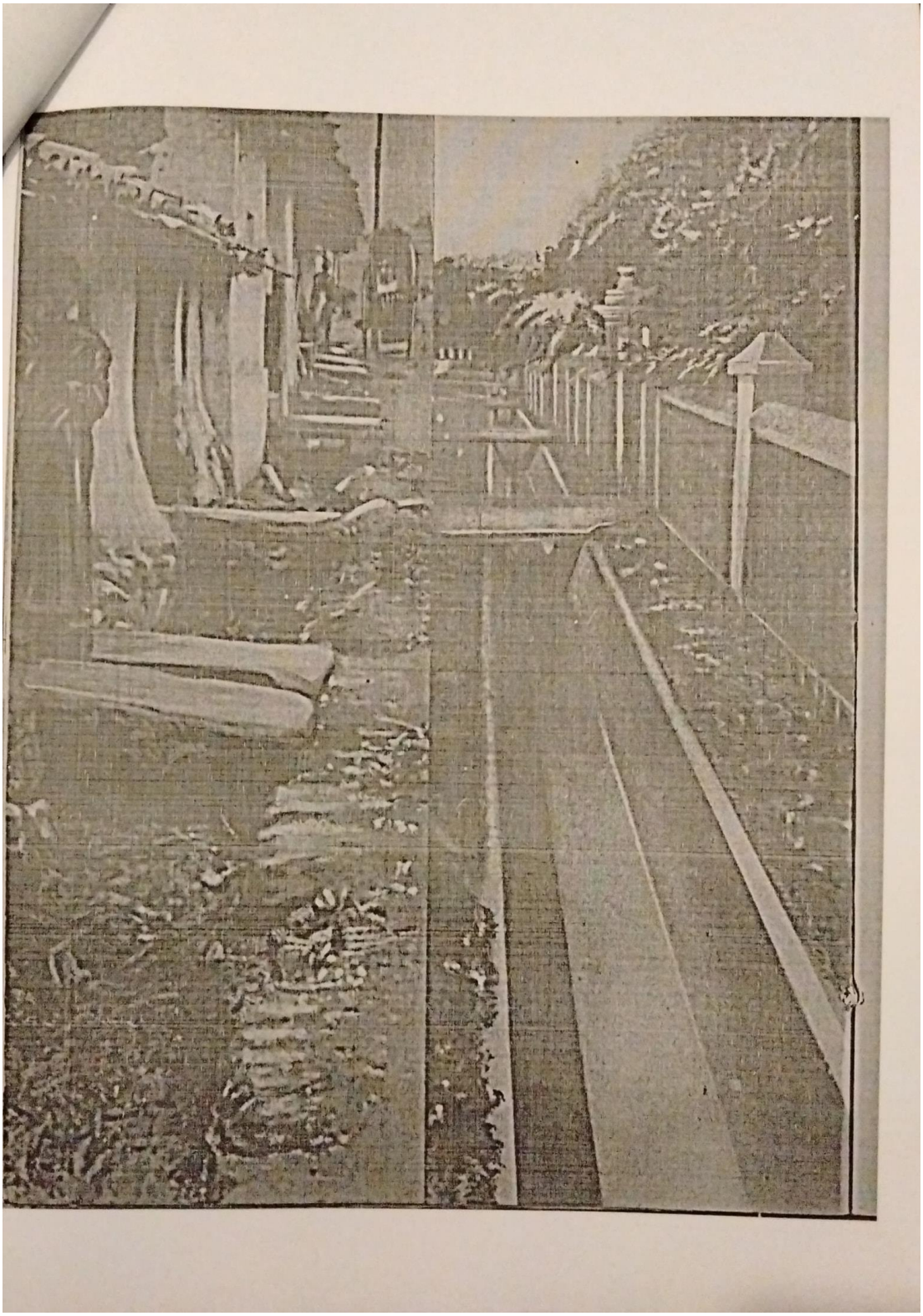


Fig. 20 – Image showing drainage of water and waste before and after utilizing concrete for the gutters. From *Our Villages of Tomorrow*.

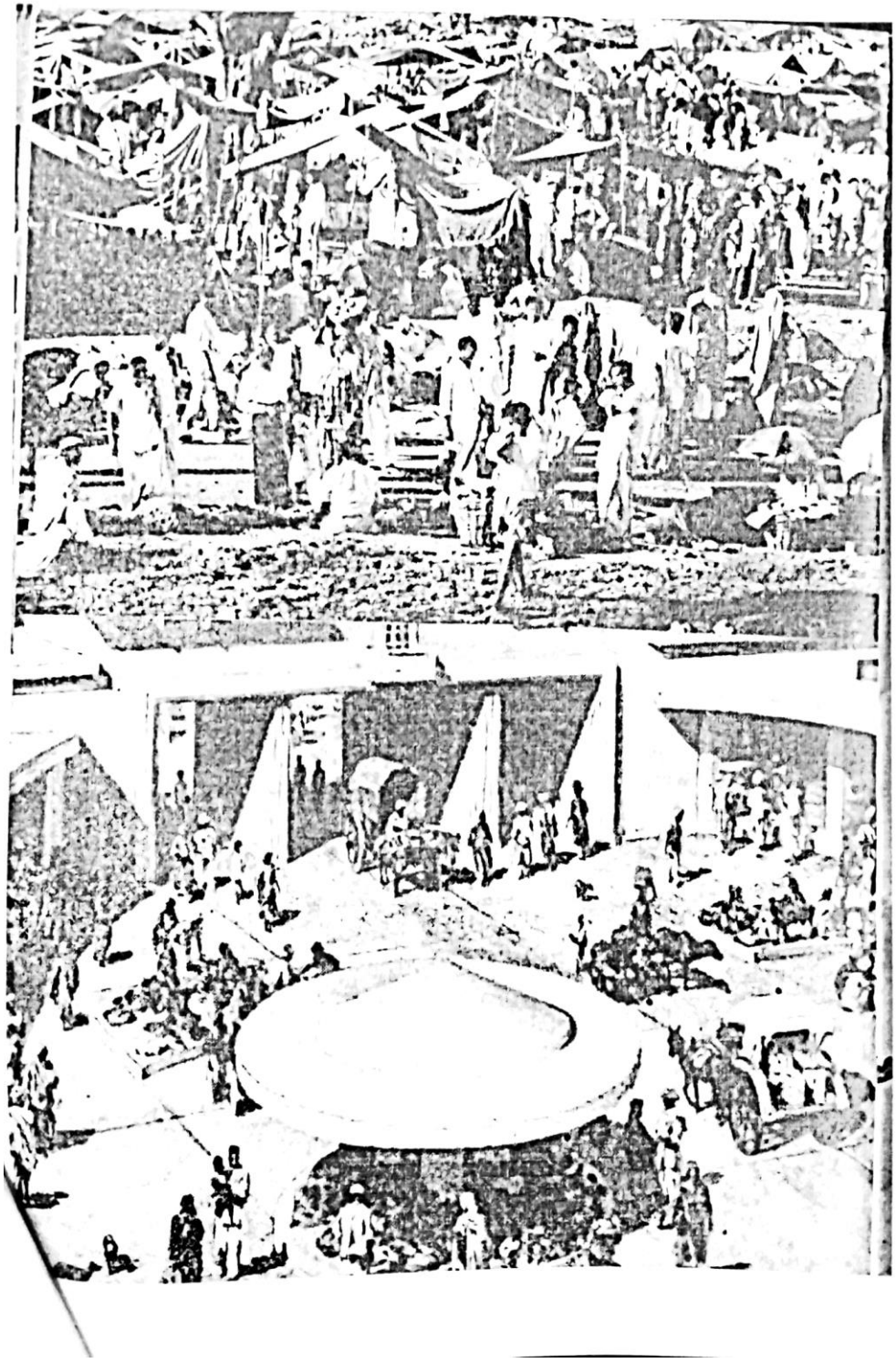


Fig. 21 – Image showing a village market square before and after utilizing concrete for various built elements. From *The Modern Village.*

Fig. 22a – Indian terraces used an extended domestic space. Seen here is a variety of foods being sundried for storage. Old Delhi, India,

Fig. 22b – Clothes being line-dried on terraces. Uttar Pradesh, India.

Fig. 23 – *Uttaryan*. Terraces become an active communal space during this annual the kite flying festival in India. Ahmedabad, India. 2022.

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