

The Nature of Tropical Architecture in Indonesian Modernism

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The idea of environmental design – or loosely referred to as “tropical architecture” – is an ever-present but underlying discourse in modern Indonesian architectural history. Despite being tentative and, at times, overshadowed by other dominant issues, the quest for climate-related environmental tropical design is apparent in almost every generation of Indonesian architects.

Too often we come across the two-word phrase: “tropical architecture” to conjure up preconceived ideas illustrating a building or a complex of buildings dominated by the presence of the roof, frequently lacking walls, and surrounded by lush tropical gardens and water bodies. The term “tropical” is a synecdoche in Indonesian architectural history. It potentially addresses the complexity of the tropics – ecologically, environmentally, and culturally – and how it has been interrelated to architectural discourse. The term, despite being omnipotent in every historical period, tends to be only tentatively present in almost every architectural discourse throughout the 20th century.

Architects and engineers (as well as scientists) throughout the 20th century have been occupied with the prospect that architectural design and building mechanical services might help people to deal with undesirable climatic conditions, not only to overcome discomfort but also to provide better protection against growing unsanitary, pollution-infested, and hazardous environments. Architecture, it seemed, swung from an artistic discipline towards a scientific and technological domain. In the light of techno-scientific development in architecture, a fellow architect-researcher, Lai Chee Kien suggests, in the working paper that he wrote in 2002 entitled “Tropical Tropes”,¹ that “tropical architecture” was started as a colonial project, when infrastructure development in the tropics – where most colonial exploitation occurred – was a necessity for European enterprises and institutions to work. During the postwar decades, it became a fashion where technological transfers, aid, and business investments were delivered from the First and Second World countries to the rest of the world. This is not entirely new within the scholarship of the Modern Movement,

but it highlights the global extent of modern architecture, its various historical precedents in the former colonial states, and, more importantly, in post-colonial development.²

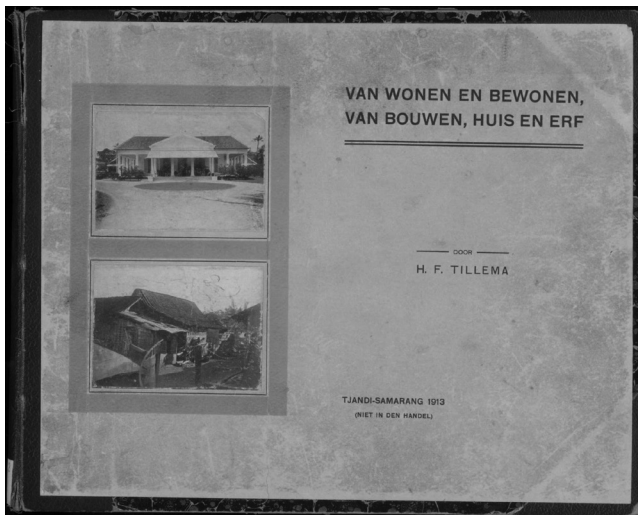
Along with the development of colonial cities and infrastructure in the Dutch East Indies, the earliest discussion concerning the tropics was related to the alarming health problems in towns and villages caused by hygiene-related “tropical” diseases. Interestingly, the earliest accounts on the issue did not come from architects, but from a retired Dutch army general and engineer, G. W. F. Vos. In 1890, he submitted the only entry in a competition held by the Royal Institute of Engineers and The Association for the Promotion of Medical Sciences on developing a hygienic living environment in the Dutch East Indies. His proposal, titled “Indonesian building hygiene, a test of an application of medical sciences to building in the Dutch East Indies”, addressed concerns, based on modern medical principles, on health-related hazards in traditional and vernacular building practices. One of Vos’s strongest comments on vernacular building practices was the use of excessive verandahs which caused dark and damp domestic space interiors.³

There were also medical concerns about the effect of tropical heat on the white population. An article written by a Dutch doctor published by *De Indische Gids*, 1891, reports that heat may harm the *geestkracht* [mental stamina] of the white people in the Indies.⁴ It said to endanger Europeans’ well-being and diminished their productivity. Engineers sought inspiration from abroad to overcome this problem; however, for many, the idea of mechanically air-conditioned spaces (in buildings and train carriages) was considered a ridiculous solution at that time.

By 1938, air-cooling installations were already quite common in institutional

buildings, such as hospitals.⁵ Several engineers based in Surabaya reported their implementation of mechanical air conditioning in the colony in a prestigious engineering journal, *De Ingenieur in Nederlandsch-Indie*. It was reported that air conditioning was a necessity in hospitals as it enabled desired conditions for operating, nursing, as well as other health care activities. Due to the increasing popularity of air-conditioning, electrical engineer P. Timmerman warned the electricity supply companies to promote and to anticipate the surge of electricity in the near future.⁶ The architect-engineer B. de Vistarini welcomed the use of air-conditioning in the country.⁷ He predicted that it would decrease the height of office spaces and consequently its volume; therefore more floors could be fitted into the same building height, making office spaces in the tropics not so different from the ones in Europe. The climate-controlled buildings would benefit from air-conditioning, since the windows would be closed all the time, which would reduce street noise. In a larger context, the air-conditioning of indoor spaces would reduce the distance between buildings. Vistarini, however, warned that the perimeters of buildings should be designed to protect users from the temperature difference between indoors and outdoors. He also asserted that the external skin of a modern air-conditioned building – walls, windows, and doors – should be strongly built, becoming more solid than usual.

Before air conditioning became the norm, engineers and architects had to rely on local vernacular practices and models, whilst, at the same time, creatively employing modern architectural elements to provide desirable conditions for habitation. C. J. de Bruijn, another retired general from the Dutch army corps of engineers, expanded and republished Vos’s 1891 book in 1926 as a 9 volume set. The first volume addressed 15 infectious tropical diseases and suggested ways to eradicate them. Diseases were considered to be closely related to environmental issues and were seen as avoidable through good planning measures. De Bruijn indicated seven aspects of environmental planning: air, natural sunlight, water, ground, water supply, drainage, and sewerage. In the second volume, he explored and reconsidered the common use of building materials and construction. He mentioned the hygienic and functional requirements demanded by various building types such as houses and housing, sports facilities, schools, factories, abattoirs, prisons, markets and stalls, and military buildings. The book provided instructions and models on how to design and build, not limited to health and hygiene but also to achieve comfort and avoiding problems specific to tropical conditions.



01 Hendrik Freerk Tillema, the book cover of *Van Wonen en Bewonen, Van Bouwen, Huis en Erf*, 1913. © TU Delft Library, retrieved from <http://colonialarchitecture.eu>.



02 F. J. L. Ghijsels, Koninklijke Paketvaart Maatschappij Hospital, Petamburan, Jakarta, Indonesia, 1914-1915. © Collectie Stichting Nationaal Museum van Wereldculturen.

Before de Bruijn's contribution, Hendrik Freerk Tillema (1870-1952), a Dutch pharmacist-entrepreneur living in Semarang, raised concerns about the living conditions of the common people in the colony. In 1913, he published *Van Wonen en Bewonen, Van Bouwen, Huis en Erf* [Of House and Home; Building, House and Site] discussing the layout of housing areas, water management, and good quality drinking water. Amongst the problems in general housing, highlighted by Tillema, was the insufficient protection against the sun, poor ventilation conditions, vegetation, un-separated water flows, blocked drains, and stagnant water. In 1915-1923 Tillema consistently advocated his cause for better urban planning and published his masterpiece *Kromoblada* – a series of publications on urban hygiene and infrastructure planning in the Dutch East-Indies.

In the first four volumes of *Kromoblada*, Tillema explored nature in the tropics, diseases, and colonial lifestyles at length. Moreover, the book showed the connections between infectious diseases and an unhealthy and disorderly environment. The publication featured street and sewerage normalization projects in towns, industrial facilities, and urban settlement improvement projects.

The concerns were shared among many engineers who were mostly associated with the Public Works Department specializing in improving hygiene and sanitation. Regarding the recently finished *Koninklijke Paketvaart Maatschappij* [Royal Shipping Society] Hospital in Petamburan, Batavia (designed by F. J. L. Ghijsels, 1914-1915) an article published in *Het Nieuws van de Dag van Nederlandsch-Indie* [The News of the Day of the Dutch East Indies] featured the project positively. The article mentioned the hospital project as

having a distinctive character that integrated the environmental control elements on the building with the architectural expression.⁸ The environmental control features – such as verandah galleries, large roof overhangs, deep openings – were becoming more and more common in institutional projects in the years leading up to the 1920s and 1930s, coupled with the introduction of simpler geometry, and asymmetrical architectural compositions.

Dutch engineers contributed by sharing their research and experience in the colony through journals, publications, and teaching as well by appropriating technological innovation from Europe and America. The association of Building Engineers (Vereeniging van Bouwkundigen in Nederlandsch-indie, or VvB) established *Indisch Bouwkundig Tijdschrift* (IBT) [Indies Architectural magazine] as its official journal, which disseminated modern ideas among the early generation of architects in the colony.⁹ The editorial content of the journal was associated with BOW's affairs until 1927. In 1933 IBT merged with another journal, *Locale Techniek* – which was the official journal of the Association of Local Interests (Vereeniging voor Locale Belangen). As a result, the new journal, *IBT Locale Techniek* orientated its editorial content more towards urban issues in the colony. In March 1935, a new “laboratory for technical hygiene and sanitation” was established in Bandung.¹⁰ By August 1938, the laboratory already served as an institute and hosted an international conference on air-conditioning. The conference specifically discussed the relationship of air-conditioning to comfort, air-conditioning and malaria, and the necessity of air-conditioning for the white population in the tropics. The issue was considered to be of grave importance.

Thanks to the immediate availability of modern construction materials and techniques from Europe and thanks to the prosperous colonial economy between the Wars, the architect-engineers in the early 20th century enjoyed vast building opportunities and the freedom of experimenting with new forms. The freedom brought by the new styles gave a fresh outlook on how modern architecture dealt with the tropics in terms of both the climate and the culture. Modern tropical architecture eventually developed a wider range of expression using new materials and engaging references both from the variety of vernacular architectural forms and the modernist architectural vocabulary.

The pivotal point in the technical discourse of the journal was when several prominent architects started discussing how the inevitable modern technical novelties associated with the European modern culture might diminish traditional indigenous aesthetics and crafts. Following the humanitarian pressure from the Dutch parliament, the Netherlands issued an “Ethical Policy” towards the colonies aiming to better attend to the welfare of her colonial subjects. The policy was followed by the Decentralization Act, 1922 that effectively created autonomous municipalities which led to modern town management and planning.

Several notable practicing architect-engineers were interested in the pre-existing indigenous traditions in the arts and building and even pioneered scholarship in their respective fields of interest. Some were engaged in studies and preservation of archaeological sites, especially the grand Javanese temples at Prambanan and Borobudur, others studied and were interested in the structural properties of vernacular timber construction. With

the growing sense of independence of the colonial nation-state, it was inevitable that a need arose for a “national architecture” that represented the Dutch East Indies as a synthesis of the “advanced” European-modern culture and the rich and diverse indigenous traditions.¹¹

The article “De tropisch-Nederlandsche bouwkunst in Indie” (1946) written by architect J. F. van Hoytema (1884-1955) attempted to “synthesize” two cultural architectural poles into a new, modern one.¹² On this occasion, Hoytema stressed the importance of climate science as a neutral ground. He asserted that buildings in the Indies should possess a harmony between the Dutch and native spirit, between Western technical capacities and tropical requirements. This “common ground” required architecture to handle the mechanism of adaptation to the tropical environment, such as protection against direct sunlight and strong winds, ventilation, the use of local materials, and the architectural expression resulting from these design considerations. “Tropical Dutch Architecture” derived its character from the play of light and shadow, the contrast between the white walls and the dark openings of galleries and windows. The discussion grew beyond the measure of hygiene and comfort in the tropics but engaged the wider question about the esthetic expression of the entire tropical colonial state.

An interesting prolonged debate in 1922-1924 between two prominent Dutch East Indies architects – Henri Maclaine Pont¹³ and C. P. Wolff Schoemaker¹⁴ – appeared in several newspapers. Starting in an article he wrote in 1922, Schoemaker harshly criticized what

he saw as growing overt sentimentality towards Javanese crafts and building tradition by some Dutch architects practicing in the colony.¹⁵ Schoemaker called for a more sensible appreciation for non-Javanese regional building traditions because they developed distinctive achievements in artistic expression as well as ingenuity in innovative structural and construction. Schoemaker thought that the simple Javanese roof structure system was inferior compared to the outer island traditions and deserves no special attention. In defense of the advanced indigenous roof structures, Maclaine Pont suggested that despite its relatively simple form, the Javanese roof structure has been refined through an evolved living tradition and was well-fitted to the culture it served.¹⁶ The debate over the fascination with Javanese Architecture peaked in 1924 when both architects demonstrated their engineering skills in testing whether the Javanese *joglo* roof type with its *tumpang sari* beam work was a well-built form and an effective measure in dealing with lateral forces. Underlying this argument, Maclaine Pont generally believed, despite being mostly timber-framed and terracotta-tile roofed, that the Javanese house roof form, in common with many other Indonesian indigenous roof forms, is essentially an advanced tensile structure instead of a rigid framework.¹⁷

Architect-planner, Thomas Karsten,¹⁸ staying at the periphery of the debate, was one among prominent intellectuals who was deeply inspired by Javanese architecture. Karsten was one of the founding members of the Java Instituut – an organization established in 1919 by the Dutch East Indies colonial government to study and to develop

Javanese culture. Commissioned by the institute, he designed Sobokartti (Semarang, 1930) – a modern theater dedicated to staging modern Javanese performing arts – in the form of a large *joglo* roof with modern non-traditional skylight gaps and bracing elements. When he worked for municipalities on town planning projects, he was also commissioned to design organized marketplaces. Before the early 20th century, marketplaces were occasions rather than institutions. Due to the rising urban population, marketplaces became a permanent daily necessity, therefore, they needed to be permanently housed. Karsten proposed a set of principles that catered to the vibrant exchange of commodities while enabling ease of maintenance, hygiene and sanitation control, and good ventilated and naturally lit spaces.¹⁹ In his masterpiece, Johar Market in Semarang, he employed reinforced concrete for mushroom columns and flat roofs to create a naturally-lit and naturally-cooled tropical market hall. The high ceiling and the ventilation shafts enable the interior to remain cool throughout the day despite the bustling market activities within. He also created an elevated counter for each peddler stall and an integrated drainage system to make the wet tropical market easy to clean.

The discourse of the tropics reached a pivotal point when it coincided with the success of modern architecture becoming global and adapting to suit all climates and cultures.²⁰ The relatively short period between 1945 and 1959 gave a window of opportunity for the first generation of Indonesian architects to work together with their Dutch counterparts. After independence some Dutch private corporations continued their operations in Indonesia. By then, the Indonesian government was commencing a long and difficult period of economic reform. In such a challenging and uncertain period, the Netherlands’ Ministry of Colonial Territories commissioned a new satellite town, Kebajoran Baroe (New Kebajoran), to tackle the housing crisis in Jakarta.²¹ Located 4.5 kilometers away from the old capital, the plan was designed by the first Indonesian town planner, Mohammad Soesilo (1955-), under the Dutch Central Planning Bureau. The design was centered on a few vital industrial and commercial cores surrounded by a winding web of streets creating clusters of residential blocks lined with green belts and parks. The design suggested a modern town plan that relied on motor vehicles for transportation through winding tree-lined boulevards and functional zoning. The plots were designed to cater to all income classes, with generous green areas around the housing plots. The satellite town was implemented in a relatively short time. Due to the



03 Albert Aalbers, Savoy-Homann Hotel, Bandung, Indonesia, 1939. © Het Nieuwe Instituut.

inability of the government to subsidize the lower-income class, by the early 1950s Dutch corporations stepped into *Kebijakan Baroe* and built apartments and houses for their employees. Architect-engineers and contractors were sought-after in this new development. The rising demand for private commissions to design and build houses enabled private practices to flourish. Many architect-engineers, both Dutch and Indonesian, were also acting as builders. Thanks to the *tabula rasa* provided by the new development, architects enjoyed increasing freedom to design the buildings in a new fashion, distanced from the prewar esthetics. Sheltering roof forms and straight lines were dominating domestic architectural projects.

Indonesia reestablished key essential colonial institutions during the transition period and managed to house them in new buildings. Among the prominent design-build firms from the colonial period, only a few survived the war. Among the very few, the architecture-engineering firm *Ingenieurs-Bureau Ingenegenen-Vrijburg (IBIV)* emerged as one of the most productive practices in the 1950s.²² The firm was started in 1936 providing all-round design-build services. It began producing interesting architectural design projects after architect-engineer Albert Wilhelm Gmelig Meyling (1909-1991) served as the chief designer and architect.²³ Amongst the first in the country to do so, the firm employed distinct reinforced concrete sun shading devices, ventilation louvers, as well as rough cement finishes in many of its institutional projects in major Indonesian cities and started the surge of a new style. IBIV's most monumental work was arguably the headquarters for the State Center for Agriculture in Jakarta, 1955. The building is a four-story office building presented as a slightly curved box with a flat roof and perpendicular projecting wings, enveloped within an elaborate square-framed sun shading device. The project was once the tallest building in the capital.

The early 1950s was also an era where the first generation of Indonesian architects and engineers (and builders) surfaced as independent practices. Amongst the most prominent was Friedrich Silaban (1912-1984). His most important works were designed between 1954 and 1966 under the patronage of Indonesia's first president, Soekarno (1901-1970). After coming to notice by winning three consecutive prestigious architectural competitions, Silaban was entrusted by Soekarno to work on numerous symbolic architectural projects for Jakarta and was closely consulted by Soekarno for the urban development of the capital.

Silaban's architectural oeuvre is dominated by streamlined building masses, facades

adorned with sun-shading elements, topped with a straightforward roof. His buildings always provided generously spacious, well-sheltered verandahs and deeply situated interiors, completely avoiding the risk of splattering rainwater and excessive sun. These environmental features remained consistent throughout his career. They are even considered as an unmistakable characteristic of his designs, despite them now being very common and widely-used. He always rejected the use of mechanical air-conditioning or any kind of mechanical-electrical apparatuses. Silaban's emphasis on environmental design was self-justified as an expression of nationalism. In 1982, late in his career, he delivered a speech for a congress of the Indonesian Institute of Architects addressing how a national identity can be expressed by architectural design.²⁴ He asserted that modern Indonesian architectural design should relate to certain climate-related traditions and customs (and vernacular architectural spaces) within Indonesian societies. Silaban confidently suggested that being responsive to the hot-humid tropical climate was an essential feature of Indonesian architectural identity. Despite starting as a colonial and global discourse, it seems that Silaban still believed that designing "tropical architecture" was a patriotic act for an Indonesian architect.

Advantaged by the postwar global economy and flow of economic aid, technical innovations and applied science were also exchanged and transferred among nations.²⁵ Within this context the Indonesian Ministry of Public Works established the *Lembaga Penelitian Masalah Bangunan (LPMB)* [Research Institute for Building Problems] in 1953 to research infrastructure and housing problems. In 1963-1965, LPMB received significant support from the United Nations Special Fund for Developing Countries to set up a building material development laboratory. New techniques, materials, and methods were introduced to Indonesia along with workshops, surveys, research projects, conferences, and the exchange of scholarly literature and reports. From 1955, LPMB disseminated scientific articles and scholarly surveys through a periodical *Masalah Bangunan* [Building Problems]. More than half of the topics discussed in the journal concentrated on housing and general building affairs, including sanitation and hygiene infrastructure. About 30% of the publication was dedicated to building materials and construction methods. Unfortunately, the support and network were cut short in 1965 when Indonesia left the United Nations due to the confrontation between Indonesia and Malaysia. Despite the shortfall of funds, between 1965 and 1980, LPMB was integrated

into the Department of Public Works and remained an influential institution producing standards and textbooks which set curricula for architecture and civil engineering training in vocational schools and universities.

Some of LPMB researchers were not only productive scientists but also very active practitioners and professors who effectively disseminated "architectural science" and environmental design among the younger generation of Indonesian architects. Djauhari Sumintardja, one of the key figures in LPMB paid special scholarly attention towards Indonesian indigenous vernacular structures. He published "Kompedium Sejarah Arsitektur" [A Compendium of Architectural History, 1966] as the first Indonesian architectural history textbook that became the foundation for architectural history curricula for almost all architecture schools in the country. In the textbook, Sumintardja included the vast range of regional architectural typologies along with global architectural history. Some of the LPMB researchers dedicated their research to local climatic issues and established standards for thermal comfort in the region. The first textbook on climatic design for Indonesia, *Iklm dan Arsitektur di Indonesia* [Climate and Architecture in Indonesia, 1966], was written by Saleh Amiruddin. Kartahardja published *Hygiene Bangunan dalam Usaba Pembangunan Perusahaanan dan Perumahan* [Building Hygiene in Commercial and Housing Projects, 1971] that provided practical instructions and principles on designing healthy and comfortable housing.

By the 1980s, architecture students were immersed in architectural sciences and environmental design from the textbooks produced by their professors as well as translated from abroad. Manuals such as Maxwell Fry and Jane Drew's *Tropical Architecture in the Dry and Humid Zones*, Georg Lippsmeier's (1923-) *Tropenbau: Building in The Tropics* (1969), Otto Königsberger's *Manual of Tropical Housing and Building*, and G. Z. Brown's (1942-) *Sun, Wind, Light: Climatic Design Strategies* (1985) were readily available as textbooks. A respected Indonesian architect-priest, Yusuf Mangunwijaya (1929-1999), added another important volume to the long list of environmental design books by publishing his textbook *Pasal-Pasal Pengantar Fisika Bangunan* [Introduction to Building Physics, 1980]. Mangunwijaya's modules on environmental design principles were not only teaching the basics but also mentioning local contexts and vernacular building materials and practices.

The history of dealing with the climate and the respect of the influential practitioners like Silaban and Mangunwijaya set very strong continuing moral values among younger generations of Indonesian architects. Despite



04 Thomas Karsten, Sobokartii Theater, Semarang, Indonesia, 1930.
© Setiadi Sopandi.



05 Thomas Karsten, Djohar Market, Semarang, Indonesia, 1936.
© Collectie Stichting Nationaal Museum van Wereldculturen.



06 Geert Boom for Job & Sprey, Bataafsche Petroleum Maatschappij/ BPM Shell company housing (now private houses), Kebayoran Baru, Jakarta, Indonesia, 1955. © KITLV, public domain.



07 A. W. Gmelig Meyling for Ingenieurs-Bureau Ingenegeren-Vrijburg (IBV), Pusat Perkebunan Negara/ State Center for Agriculture (now Indonesian Election Commission), Jakarta, 1955 © Het Nieuwe Instituut, reproduction by Setiadi Sopandi.



08 Friedrich Silaban, Bank Nasional Indonesia 1946, Jakarta, 1963. © F. Silaban Archive

contemporary practices no longer strictly adhering to the “conservative” view, architects are reluctant to admit that their projects are dependent on the use of air-conditioning or anti-UV coated glass curtain walls. They are more willing to be known for their buildings that are covered by sun-shading devices or extensive roofs, as inspired by vernacular and mid-century modernist architecture.

Notes

- 1 Chee-Kien Lai, “Tropical Tropes: The Architectural Politics of Building in Hot and Humid Climates”, Working Paper presented at *(Un)bounding Tradition: The Tensions of borders and regions*, 8th IASTE International Conference, Hongkong, 12-15 December 2002.
- 2 Jiat-Hwee Chang, pursued the discourse on tropical architecture within the sphere of the British colonial network and published *A Genealogy of Tropical Architecture: Colonial networks, nature and technoscience*, Routledge, Oxon, 2016. Vandana Baweja writes about Otto Königsberger and British architectural role in tropical architecture research. Vandana Baweja, “Otto Königsberger and the Tropicalization of British Architecture” in Duanfang Lu (ed.), *Third World Modernism: Architecture, Development and Identity*, Routledge, London, 2010.
- 3 C. J. De Bruijn, *Indische Bouwhygiene*, Landsrukkerij, Weltevreden, 1926 is essentially an expanded version of G. W. F. Vos, *Indische Bouwhygiene* published in 1891. The publication consists of several volumes.
- 4 Dr. Sluijs, “P.J.A., ‘Over Acclimatisatie’ 627 in *De Indische Gids*, 1891, quoted from Rudolf Mrazek, *Engineers of Happy Land: Technology and Nationalism in a Colony*, New Jersey, Princeton University Press, 2002.
- 5 H. A. Thornburg, “Air-Conditioning in Hospitals”, *De Ingenieur in Nederlandsch-Indie*, Vol. 5, No. 11, November 1938, vi, 39.
- 6 P. Timmerman, “De bevordering van lucht-conditioneering door de electriciteitmaatschappijen en het verbruik van electrischen stroom in Nederlandsch-Indie”, *De Ingenieur in Nederlandsch-Indie*, Vol. 5, No. 11, November 1938, vi, 46.
- 7 B. de Vistarini, “Luchtconditioneering en bouwkunde”, *De Ingenieur in Nederlandsch-Indie*, Vol. 5, No. 11, November 1938, vi, 43.
- 8 Akihary, Huib. Ir. E. J. L., *Gbijsels: Architect in Indonesia (1910-1929)*, Amsterdam, Seram Press, 2006, 38.
- 9 Mahatmanto, “Role of the Journal of Building Engineers in Dutch East India In Discussing the Emergence of Indonesian Modern Architecture”, in *Journal of Asian Architecture and Building Engineering*, Vol. 14, No. 3, September 2015.
- 10 Mrazek, 78-79.
- 11 Architect-planner Thomas Karsten believed that the new future “Indies Architecture” needed to revive its own culture and architecture. Karsten was probably the first architect in the Indies to acknowledge the political relevance of “new architecture”. This vision would eventually serve the establishment of a new nation. This view was expressed in words and works between 1919 and 1935. Karsten insisted Europeans working in the colony (1) recognize the right of the Indies to its art form as well as the right of native art to its development, (2) give up Western architectural ideals which were undoubtedly out of place in the Indies, and instead strive for the formation of a tropical ideal through deliberate subjection to factual requirements imposed by local conditions, such as climate, light, and scale, (3) move one step further in this direction by training the native to become full-fledged architects. See footnote 19.

- 12 C. J. van Dullemen, *Tropical Modernity: Life and Work of C.P. Wolff Schoemaker*, Amsterdam, SUN, 2010.
- 13 Henri Maclaine Pont (b. 1884, Batavia – d. 1971, The Hague) studied civil engineering in Delft and moved back to the Dutch East Indies after graduation where he received his first major work to design the Semarang-Cheribon Stroomtrammatschappij Headquarters in Tegal. Apart from being a very prolific master builder, he was also a very dedicated and enthusiastic amateur archaeologist focusing on the Javanese Hindu-Buddhist period monuments. His best-known works are the Technische Hoogeschool Bandoeng, 1919-1921 (now Aula Barat Institut Teknologi Bandung, Bandung, Indonesia) and Puhsarang Catholic Church and pilgrimage site, 1937 (Trowulan, East Java, Indonesia).
- 14 Charles Proper Wolff Schoemaker (b. 1882, Semarang – d. 1949, Bandung) was a very famous architect in the Dutch East Indies. He studied at the Royal Military Academy in Breda and worked consecutively as a military engineer in the Royal Dutch East Indies Army and headed the Public Works Department in Batavia. He established his practice in 1918 and designed notable buildings in Bandung where he was appointed as professor of architecture in the Technische Hoogeschool Bandoeng.
- 15 C. P. W. Schoemaker, “Kunst en Wetenschap Indonesische Bouwkunst”, in *Bataviaasch Nieuwsblad*, 20 November 1922.
- 16 Henri Maclaine Pont, “Javaansche Architectuur, Het Inlandsche bouwambacht”, in *De Indische Courant*, 1 November 1923.
- 17 Henri Maclaine Pont, “Beginselen der Javaansche Bouwconstructie”, in *IBT Locale Techniek*, 1924.
- 18 Architect and planner Herman Thomas Karsten was born in Amsterdam in 1884 and became a friend of Henri Maclaine Pont during his education in Delft. In 1914, he arrived in Java and immediately began working in Maclaine Pont’s office in Semarang. In 1916 he was appointed as an advisor for the Semarang municipality and started his career as a prominent town planning advisor for many municipalities between 1916-1924.
- 19 In an article published in the *IBT Locale Techniek* (No. 2, March-April 1938), Karsten explained the development of market hall designs commissioned by the Dutch East Indies municipalities since 1929. The market designs featured in the article included Pasar Gede (Solo, 1929), Pasar Djatingaleh (Semarang, 1930), Pasar Central (Semarang, 1930), Pasar Ilir (Palembang, 1933-37), and Pasar Tjepoe (1937). The designs were intended to provide shelter safe from fire hazards as well as to ensure health and hygiene. They included an effective use of raised concrete platforms for ease of maintenance and logistic purposes, drainage systems, and roof openings for ventilation. The high volume under the roof enabled the indoor air to remain cool; while the roof ventilation permitted the escape of hot air and provided indirect natural illumination to the deep part of the indoor space. Karsten elaborated on the varied uses of materials and construction systems related to the cost of construction.
- 20 Henry Russel-Hitchcock Jr. delivered a paper “The Acclimatization of Modern Architecture in Different Countries” at the AA in London, 1946. In his paper, Russel-Hitchcock concluded that “international modern architecture” might be expected as “a new language not to be merely a vehicle for common international platitudes, but a vehicle of expression for regional and national particularities.” Lai, 5.
- 21 The city then was still ruled by two opposing governments; half was run by the colonial municipality, the other was by the republican.
- 22 Pauline van Roosmalen, Maarten Hercules, “Bouwen in Turbulente Tijden: Het Werk van Ingenieurs-Bureau Ingenegeren-Vrijburg (IBIV) (1936-1957)”, in *Bulletin Koninklijke Nederlandse*

- Oudheidkundige Bind*, 2016, Jaargang 115, 2016, No. 1, 34-50.
- 23 Maarten. Ir. A. W. Hercules, *Gmelig Meyling: Prominent architect in Nederland, Nederlands-Indie en Indonesie (1932-1974)*, Unpublished Thesis, TU Delft Bouwkunde, 2014.
- 24 Friedrich Silaban, “Idealisme Arsitektur dan Kenyataannya di Indonesia”, in *Budihardjo*, Eko (ed.), “Menuju Arsitektur Indonesia”, Alumni, Bandung, 1996, 75-89.
- 25 Kevin Bone (ed.), *Lessons from Modernism: Environmental Design Strategies in Architecture, 1925-1970*, New York, The Monacelli Press, 2014.

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