

# HEART OF THE CRAFTSMAN: SECTION DRAWINGS OF CLASSICAL TAIWANESE ARCHITECTURE

直探匠心：李乾朗剖繪台灣經典  
古建築

*Examine the finest works of Taiwanese architecture from literally every angle with master architect Lee Chian-Lang, whose book shows off the unique splendor of indigenous, dynastic, and colonial Taiwanese architecture.*

The homes we build say more about us than simply how much stuff we have to store; building styles reflect cultural values, religious tenets, and our relationship to our environment. Taiwan's architectural landscape is among the most diverse in southeast Asia, because the country has occupied a crucial position at the crossroads of maritime trade routes since humans began to sail. Master architect and urban planner Lee Chian-Liang is here to show off the unique splendor of indigenous, dynastic, and colonial Taiwanese architecture from literally every angle.

*Heart of the Craftsman* takes an in-depth look at thirty-five different buildings of vastly different styles located all across Taiwan. A marvelous hand draughtsman, Lee offers full-color representations of a Portuguese castle, indigenous cave house complexes, aristocratic mansions, imperial-era temples and more. Each piece is presented from multiple angles, such as a "bird's eye view", a "bug's eye view", a "fish-eye view", and many others in order to highlight its special characteristics.

Lee supplements his beautifully-crafted images with detailed documentation and analysis of each building, in which he explains its history, its composition, its architectural pedigree, and its unique value. *Heart of the Craftsman* provides a wealth of information in a



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clear, easily understandable format that leaves readers with a broad understanding of what can sometimes feel like an intimidating subject. It gives us both the matter and the meaning of Taiwanese architecture.

## Lee Chian-Lang 李乾朗

Born in 1949, Lee Chian-Lang found himself fascinated by classical Chinese architecture as an undergraduate at Chinese Cultural University in Taipei. He teaches archeological preservation at National Taiwan University of Arts and popular art at National Taipei University. He has written multiple books on Taiwanese architecture covering multiple periods in the nation's history.

# HEART OF THE CRAFTSMAN: SECTION DRAWINGS OF CLASSICAL TAIWANESE ARCHITECTURE

By Lee Chian-Lang

Translated by Jack Hargreaves

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### Introduction to Classical Taiwanese Architecture

Few examples of classical architecture remain standing in Taiwan. Indigenous peoples have lived on these islands for over a thousand years, yet since their preferred building materials are perishable, no structures of theirs more than a hundred years old still remain. The oldest buildings left are the forts that the Dutch and Spanish constructed in their brief rules during the seventeenth century European Age of Discovery, like Fort Zeelandia and Chihkan Tower in Tainan, and Fort San Domingo in Tamsui District, New Taipei. Apart from these, temples and manor estates from the last two Chinese dynasties make up the most well-preserved buildings of historical note. Taiwan's central position at the crossroads of shipping routes between South and East Asia made it a meeting place for the cultures of East and West, which motivated its unique architectural diversity.

### Adapted to the Elements: Resisting Earthquakes, Wind and Heat

A subtropical country, Taiwan suffers frequent earthquakes and typhoons. Securing their homes against seismic forces, gale-force winds, and high temperatures was the primary concern of its first settlers. Many indigenous peoples chose to construct semi-underground buildings in high mountain regions or along the coast. The Tao (Yami) people of Orchid Island, for example, build their homes partially underground and cover them with thatched roofs framed with bamboo poles and a long front slope, which protects against the weather and helps keep the interior cool. The mountain-dwelling Atayal also build their houses half-below grade, and with curved roofs to provide shelter from the wind and preserve heat. Han Taiwanese prefer deep eaves and roof overhangs on their homes, and build high pavilions to provide shady escapes from the summer heat. Arcades commonly line their streets, so pedestrians can navigate a town in comfort, and commercial activity can continue undisturbed by the elements. In Lukang, these "skyless" streets once kept harsh sunlight and heavy rains off traders and their customers while they talked business.

Airflow and ventilation are also central points of concern in Han building design. Generally, every room has two windows; some also have a window in the door to allow air to circulate. Notably, main rooms often have two windows and a door in their façade, as well as two additional vents beneath the eaves with the fine-sounding name of "phoenix-eye windows". Windows also flank both sides of an altar table, letting in a cool draft during torrid summer days.

Besides how best to suit the local climate, classical Taiwanese architectural design also takes into account the availability of local materials. Coastal cities made use of the ballast stones dumped by ships that passed through the Taiwan Strait, while mountain communities gathered local sandstone and shale. The Drekey and Paiwan peoples in southern Taiwan mostly use stone slabs for their buildings, though bamboo features widely. The “*ang moh* clay” imported to the country by the “red-headed” Dutch was actually a kind of cement made by mixing the lime from burnt oyster shells with sand and syrup.

*/ Arcades line the streets to keep pedestrians out of the sun and rain.*

## **A Tradition from the Mainland • Schools of Craftsmanship Galore**

Han architectural styles derive from a tradition extending back thousands of years in mainland China. The timberwork techniques evident in certain extant buildings are much the same as those used in the Tang-Song period (618-1279), with many exacting methods practiced by local craftsmen resembling almost exactly those recorded in Li Mingzhong’s *Methods of Construction*. Even in recent history, timber beams and pillars with mortise and tenon joints remain the framework of choice for larger residences and temples.

The use of *quatong* (lit. “melon barrel”, ornamented, tiered short posts), *diaotong* (lit. “suspended barrel,” festooned supporting columns beneath the cornice), and *dougong* (lit. “cap [and] block”, interlocking wooden brackets that form decorative corbels) to reinforce the timber structures of these kinds of buildings showcases the range of distinct carpentry styles brought to Taiwan by schools of craftsmen from the Minnan and eastern Guangdong regions of China. Each school had its own approaches to roofing; the Quanzhou School opted for sparse rafters, while the Zhangzhou School preferred thick ridgepoles, and the Chaozhou School were masters of fine carvings. The Lungshan temples in Lukang and Bangka, the Baoan Temple in Taipei, and the Sanshan Guowang Temple in Tainan, respectively, exemplify their styles.

In the early twentieth century, native Taiwanese craftsmen rose to prominence. Chaotian Temple in Beigang and Chen Dexing Ancestral Hall in Taipei both boast *jasichui* (lit. “false-four-overhang”) roofs, or double-layered eaves on each of their corners, expertly combining complex structural timberwork with accomplished molding. The advent of *jasichui* roofs in Taiwan marked a milestone in the development of local architecture. It redefined the temple for future generations of designers and ushered in a trend that has lasted since 1910.

There were also numerous other special techniques in use throughout that era. Adding a shorter roof beneath the main roof, for example, forms an “*ancuo*” (lit. dark space), which divides the interior space into main and secondary areas. Although such two-layered roofs are inferior to simple unitary roofs in terms of sturdiness and rain disposal, they can be seen throughout Southeastern China. Ming dynasty designer Ji Cheng refers to them in his monograph *The Craft of Gardens* as “Drainage Rafters”; surely, they must be an age-old tradition. We can find them at Tainan Confucius Temple, Lukang Mazu Temple, and Tamsui Yinshan Temple.

Another key source of structural solidity besides large timber framework are brick walls. Lai-ching Hall, a two-story building on the site of the Lin Family Mansion and Garden in Banqiao, has both a sturdy timber structure and a thick brick wall at each corner for reinforcement. Tainan Confucius Temple's Ta-Cheng Memorial Gate also incorporates brickwork into its frame, with broad cross-shaped walls that buttress its two pillars and, thanks to the swallowtail ridges atop them which reach in each direction, make for both a stronger structure and a more stately aesthetic.

Examples of ingenious joinery can be found on other structures besides estate residences and temples. Yingxi Gate, the east gate in Hsinchu, and Chengen Gate, the north gate of Taipei's city walls, both feature exceptional timberwork. The former's value lies in how closely it matches its description in documents written when it was first built in 1827, which record the amount of timber and stone and the number of bricks and tiles used. Meanwhile, Chengen Gate is famous for its incredibly well-preserved interior, thanks in part to tight entry restrictions which have remained in place since its construction during the 1890s. It goes without saying, then, that the structures are invaluable artifacts for research on classical architecture.

*/ Lee Teng-fan's Residence in Daxi District, Taoyuan City is symmetrically arranged along a central axis, with the most important buildings and rooms being given the innermost position. Its design also ticks the box for "Water in front like a mirror," an important geomantic and aesthetic principle.*

### **Confucianism and Taoism Mixed with Folk Belief**

Confucian and Taoist thought lay at the core of architectural design in pre-modern Taiwan. Confucians attributed moral values to certain geographical features, like bodies of water and mountains, which they believed to facilitate self-reflection, self-cultivation, reverence for Heaven, emulation of ancestors, and respect for hierarchical order. The latter they represented architecturally with a symmetrical layout along a central axis, an idea based on the traditional "zhao-mu, left-right" system for parties attending an offering ceremony in an ancestral hall, which ensured attendees were positioned opposite each other according to order of descent (father opposite sons, the close opposite the distant, the older opposite the younger). This arrangement maintained the Central Mean, bringing balance and harmony to the space. Taiwanese Han homes have axial symmetry too, with the central, innermost position being the most important, and the outermost the least. A close look at Confucian temples and classic estates, like Lin An Tai Historical House, the Lin Family Mansion, and the Lee Family Estate in Luzhou, reveals a scrupulous symmetry in their layouts. The women within the inner spaces even had their homelives circumscribed by screens, behind which they went about their days.

Taoism's influence is also ubiquitous. Lao-tzu held that "great form is formless", and "to yield is to be preserved whole". These maxims communicate the Taoist principle of alignment with natural cycles, which we find reflected in Taiwanese architecture in a number of ways. "Mountains to screen the rear [and] water in front like a mirror" was one common standard for

choosing a building's location; meanwhile, pathways through classic estates often wind and curve as they near the main building. The latter is especially true of estates arranged according to the *Yi Ching's* eight trigrams, or *bagua*, which dictate that the prime orientation of the entrance relative to the main building is the *xun* position, or southeast (135°). Take as examples Xiaoyun Lyu's Mansion or Zhaixing Villa: the gateway arch of each estate sits not on the central axis, but in the southeast corner, thereby embodying the ancient ideal of blending the direct with the indirect. Channeling the flow of water around the front of a building derives from another Taoist precept, namely that "drawing water close keeps in *qi*".

As for Buddhist architecture, most temples in Taiwan are modeled after one or other "ancestral temple" in Fujian, many of which belong to the Linji sect of Chan Buddhism. The founding masters of Taiwanese Buddhism largely came from Fujian or Guangdong, where it was common for their schools of thought to blend Buddhist and Taoist ideas. During the Qing dynasty, the most popular kind of Buddhism was the domestic practice known as *Zhaijiao*. The architecture of these temples closely resembles local residents' homes, generally with a smaller, secondary building beside the main structure, and understated decoration as befits Chan philosophy. There are two chief branches of Chan Buddhism in China: the gradualist schools and the subitist schools. The former, which asserts enlightenment is attained through gradual cultivation, was popular in the north; the latter, which by contrast regarded enlightenment as attainable through instantaneous insight, predominated in the south. For example, Yongquan Monastery on Mount Gu in Fuzhou, Fujian belongs to the latter category. When monks of the southern Linji School traveled to Taiwan to proselytize, they often enshrined and worshipped local folk deities, like the "Holy Heavenly Mother" (Mazu) and "Holy Emperor Lord Guan" (Guan Yu, the God of War), which over time led to a convergence of Buddhist, Taoist, and folk iconography. The famous Chaotian Temple in Beigang was constructed in the early eighteenth century by the Linji School's Monk Shubi as an invitation for the god Mazu to extend her reach from Meizhou to Taiwan.

*/ Gables on Taiwanese houses often incorporate fengshui principles of auspicious design.*

Buddhist temples built along main urban thoroughfares often integrate elements of folk belief and Taoism into their designs. They are sites of joint worship, where the deities and spirits of Buddhism and Taoism coexist. Bangka Lungshan Temple and Pingtung Shuangci Temple, for example, house shrines to both Guanyin and Mazu. Temples built in mountainous regions, like those on Dagang Mountain in Kaohsiung, or on Lion's Head Mountain on the border of Hsinchu and Miaoli, follow the local topography. Entering via either's mountain gate, the pathway turns to lead through the Gate of Liberation and on passed the Mahavira Hall, Chan Hall, then abbot's chamber. This winding route heading deeper into the mountain evokes the tortuous path to tranquility. This arrangement is characteristic of Chan monasteries.

*/ Xianse Temple in Sanchong District stands as the fruits of a competition between master craftsmen Chen Yingbin and Wu Haitong. It is exemplary of a temple with dual main halls, dual corridors, and dual auxiliary halls.*



## Quanzhang<sup>1</sup> Craftsmen Arrive in Taiwan • Local Masters Show Their Skills

The carpenter-cum-joiner of old was both a designer and a builder. He had no need for thorough blueprints, because most of the details for a construction were stored in his head. Very few such craftsmen, however, had their names engraved into the stone of their handiwork like at Tamsui Fuyou Temple, where the stone lintel of the gate bears the names of its creators. From the end of the Qing dynasty until the Taishō era of Japanese rule in Taiwan, monasteries had the chance for a revival, and the ensuing call for craftsmen, reaching as far as Fujian and Guangdong, laid the groundwork for an architectural rivalry between local and mainland artisans.

Local master craftsman Chen Yingbin was born in what is now Zhonghe District in New Taipei. His family hailed from Zhangzhou, Fujian, where one member had been a carpenter. Chen worked on the construction of either the gate tower or yamen building erected in the then new Taipei in the late nineteenth century, an assignment which taught him how to work with larger projects. In 1908, when Chaotian Temple in Beigang had to be rebuilt after a fire, Chen was given the chance to show off his new skills. It was on this job that he first designed a *jiasichui* roof for the complex's front hall, a feature he would later add to Taipei's Bao'an Temple and Chen Dexing Ancestral Hall. The front hall of Chaotian Temple might, therefore, be called the style's archetype, especially given its profound influence on Taiwanese monasterial architecture from then on.

Xidi in Hui'an, Quanzhou, produced many talented craftsmen, including Wang Yishun, who arrived in Taipei in 1919 on a commission to reconstruct the city's Lungshan Temple. His design incorporated the first uses of mesh-shaped *dougong* and latticed ceilings in Taiwan, and heralded the considerable influence there of the "Xidi" School. To the common temple-goer, the temple is simply a place of worship. To a master carpenter, it represents a challenge, requiring both sincere reverence and a deep understanding of the fundamental concepts underlying faith in order to design and construct successfully. Every element of the temple, from its size down to the minutest carved details, must in some palpable way reflect the qualities of the deity of worship there. A temple to Guan Yu must evoke his might and grandeur, while a shrine to Mazu should communicate her warmth, tenderness, and grace.

Other masters of temple carpentry include the Taoyuan locals Ye Jinwan and his apprentice, Xu Qing, whose handiwork can be found in the Hakka regions of Taoyuan, Hsinchu, and Miaoli. Finely carved, curvy *dougong* and long, slim, winding *quatong* characterize their styles. Chen Yingbin, Wang Yishun, and Ye Jinwan all have immediately recognizable styles generated by the clarity of their visions and their individual touches, which engendered distinct schools of temple architecture within Taiwan.

*/ Local craftsmen were extraordinarily accomplished in carving, painting, clay modelling, and "cut and paste" jiannian ceramic ornamentation. Cresting is the icing on the architectural cake.*

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<sup>1</sup> Quanzhang refers to the coastal region in southeastern Fujian, China, centering around Quanzhou and Zhangzhou

## Combining Wisdom Old and New • Innovating a Long-Lasting Legacy

The use of color in classical architecture follows certain principles. Of the five elements, wood is associated with the cardinal direction East and the color green; fire is associated with South and red; metal with West and white; water with North and black, and earth with center and yellow. While there was no need to apply these principles directly in practice, certain patterns of use still arose. Green and black, for example, being darker colors, feature heavily on temples to Wang Ye and ancestral halls, whereas red and yellow abound on temples to Guan Yu, Mazu, and Confucius. Black is also the key color on many extant examples of residences built over a century ago, including Changhua County's Maxing Chen Family Mansion, the three-residence courtyard in the Lin Family Mansion and Garden in Banqiao, Taipei's Lin An Tai House, and Zeng Yung-Hsi's Jinshi Mansion in Hsinchu, where black paint covers roof beams, rafters, pillars, posts, struts, and outer walls. When some of these structures were built, the word for black, aside from the now common "heise", was "xuanse" (lit. "mysterious color"), as in "the heavens are black [mysterious] and the earth yellow." It was considered a color of honor.

Brick and lime mortar walls also naturally produce a contrast of light and dark color. Dwellings in mountainous regions often have walls that display a high ratio of mortar to brick, sometimes so high as to create a somewhat reflective surface. In olden times, people rose with the sun to work and rested when the sun set, so Hakka homes in the mountains of Taoyuan, Hsinchu, and Miaoli were built with largely white walls that better reflect the evening light, thereby extending the length of the working day. While they might be plain, white walls were a boon for the industrious.

Classical Taiwanese architecture has passed through a number of historical stages, from indigenous settlement to Dutch Formosa, from the Ming and Zheng rules to the Qing dynasty and Japanese colonial hegemony. Each regime has provided buildings of distinct form and function. But, of course, architectural development did not end there, and as societal trends and people's lifestyles shift, new kinds of construction constantly emerge, forcing the traditional and the old further and further out of the limelight. How to conserve and protect our architectural heritage has therefore become the question of the moment. While temples will not soon lose their devotional function, new equipment and ways of living promise obsolescence for old residences unless we can resolve the pressing issue of how best to renovate them for modern life. Whatever the approach, since traditional cultural values and customs remain firmly implanted in the heart of the twenty-first-century citizen, today's architecture should continue to obey the aesthetic laws of nature and marry the best of ancient and modern design.

A look at the development of architecture in the West and Japan reveals that classical traditions can provide a wealth of inspiration, from which we may unlock time-tested wisdom and achieve cultural longevity. Success in innovation, therefore, requires that we tap the wellspring of history. With that in mind, using section views, this book aims to break down architecture into a readable, recognizable, and affecting medium.

*/ Roof beams and struts painted according to age-old laws enrich a building's interior.*

## Architectural Map

### Main Studies

### Extended Look

Three-Residence Courtyard of the Lin Family Mansion and Garden

Lai-ching Hall, Lin Family Mansion and Garden

Wufeng Lin Family Mansion and Garden

Theatrical Stage in the Great Flower Hall

Zheng Family Shrine, Yilan County

Atayal Home, Alang Marosan Commune (original location)

Atayal Home, Qalang Mb'ala Commune

Maxing Chen Family Mansion

Drekay Chief's Home, Labuwan Commune

Drekay Youth Center, Taromak Commune (original location)

Tao Home

Taipei Confucius Temple

Bao'an Temple, Dalongdong

Taipei City Wall's North Gate (Cheng'en Gate)

Lin An Tai Historical House

Bangka Lungshan Temple

Chen Dexing Ancestral Hall

Yusan Hall, Yongjing Township

Chiayi City God Temple

Fort San Domingo, Tamsui District

Yinshan Temple, Tamsui District

Oxford College, Alethia University

Lungshan Temple, Tamsui District

Octagonal Tower at Tamkang Middle School

Lee Family Estate, Luzhou

Xianse Temple

Fongyi Academy

Tianjing Jiexiao Gate, Miaoli

Old City of Fongshan County

Cihou Fort

Ye Family Estate, Guanxi

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Chihkan Tower  
Great South Gate, Tainan  
Jie Guan Pavilion's Stone Gate  
Mazu Temple, Lukang Township  
Lungshan Temple, Lukang Township  
Traditional Penghu Home  
Dajia Liang Family Residence  
Xiaoyun Lyu Mansion  
Zhaixing Villa  
Chaotian Temple, Beigang Township  
Keelung City  
Orchid Island  
Yilan  
Taipei  
New Taipei  
Hualien  
Taoyuan  
Hsinchu  
Taitung  
Miaoli  
Taichung  
Nantou  
Chiayi  
Kaohsiung  
Pingtung  
Changhua  
Yunlin  
Tainan  
Penghu

### **A Look at Section Drawing Methods**

In our technologically advanced age, when everyone has a mobile phone in hand, turning to manually drawn diagrams might seem redundant, or even backwards. When I was studying

architecture in the sixties, however, draughting by hand was the most natural and proper way to work. As technology developed, so did architectural drawing, to the point where 3-D perspective projections are now easy to produce. And yet, I continue to draw classical architecture by hand, especially for structures in Taiwan and mainland China. Even buildings composed merely of wood, stone, brick, and tile afford complex frameworks, multi-layered spaces, and diverse interfaces between materials for me to render on paper. Using a camera to document them fails to capture the details in any dark spots, and a floor plan cannot depict their three-dimensionality. Despite this, for the past thousand-plus years, people throughout both the East and West have strived to reproduce that three-dimensional quality on flat pieces of paper. And so perspective drawing was born.

Architectural drawing is a vital technique for accurately representing architectural design. Unlike plan and elevation drawing, which require detailed notes about the materials used in a structure and their dimensions, architectural drawing is able to depict a structure's shape and space through illustration alone, which is why the most renowned architects in both Western and Eastern history were also highly skilled draughtsmen who could use artistic and orthographic tricks to expound a building's foundational ethos.

*Methods of Construction*, an architectural treatise by Li Mingzhong from the end of the eleventh century, boasts many exquisite block-prints of buildings from throughout China. Many of these printed images feature complex *dougong* and large timber framework. The text refers to what we now call "section diagrams" or "section drawings" as "lateral models," which it supplements with detailed annotations about the size, shape, and name of the various components used in certain buildings' timber framework. Some of the depictions of *dougong* are even rendered using a 3D-perspective technique that manages to display the whole exterior of their mortise and tenon joints. The colored pictures therein could easily be mistaken for a computer-generated image today, with each color explained in an annotation. The book even includes *jiehua* (lit. "boundary paintings"), precise renderings of buildings produced by contemporary artists using a straightedge. These images are both meticulous and beautifully finished; they represent a level of technical skill superior to any architectural images produced in the Western world even during the twelfth century.

## Characteristics of Chinese Architectural Drawing

Architecture was known as "*yingzao*" in ancient China, combining the notions of "operation" (*ying*) and "construction" (*zao*). The operation in question is conception, or design – using a 2-D image to depict the 3-D space of an envisioned structure. Architectural drawing on brick and stone was already a practice at least as early as the Han dynasty in the third century BCE, from which examples include both front-on perspectives and elevated eagle-eye views. "Depictions of Buddhist sutras" (*jingbian tu*) painted on cave walls in Dunhuang and architectural engravings in the stone lintel of the Giant Wild Goose Pagoda in Xi'an, both from the Tang dynasty, are more developed than those earlier diagrams, and closely resemble the "one-vanishing point"

projections of today, with spaces laid out such that the further an object is from the viewer, the smaller it appears. Even the roof of every building in the pictures is visible, without restricting the view of any of the beams, pillars, or *dougong* below the eaves.

“Along the River During the Qingming Festival,” by the Northern Song-dynasty painter Zhang Zeduan, depicts architecture with surprising precision. Take the gate-tower for instance, of which the foregrounded elements appear larger than those further away: the “two-vanishing point perspective” Zhang so skillfully used for the structure manages to represent exactly the building’s finer features and spatial relationship to its setting while providing a realistic sense of depth. And the camel caravan arranged so as to appear in the process of passing through the gate successfully merges the temporal with the spatial to enchanting effect. *Jiehua* scenes of the Qingming Festival commonly employed a rich array of perspectival techniques for depictions of buildings, most popular among them an elevated perspective that affords a full view of the architecture and shows the relationship between the various structures and their natural surroundings.

### **The Concept behind Western Perspectival Projections**

In the West, breakthroughs in geometrical analysis during the fifteenth-century Renaissance Period led to the development of “one-vanishing point perspective,” “two-vanishing point perspective”, “three-vanishing point perspective”, and “isometric projections”, innovations which elevated architectural perspective drawing to new heights. Master artists and engravers like Michelangelo, Raphael, and Leonardo da Vinci (to name but a few) were all proficient architectural drawers and painters, who laid the foundation for the medium’s modern form. Liang Sicheng was the first to use Western techniques to depict ancient Chinese architecture in his 1930s drawings of the Guanyin pavilion inside the Dule Temple in Tianjin. His use of light and shade in the pictures accentuates the pavilion’s features. Perspective drawing is an effective way of highlighting particular elements of classical architecture without losing sight of a building’s structural and spatial organization; the effect is that of inviting the viewer inside for a tour.

Another important method of representation is scientific illustration, which involves reproducing the observed form of a subject – in this case an architectural subject – using line- and perspectival drawing techniques to facilitate an analytical reading of characteristics relating to its era of creation, structural framework, and design style. A scientific illustration can be a useful resource for comparison against the literature related to a building, or even the extant building itself, and therefore can be very helpful for constructing a history of architecture. The chief aim of scientific illustration, beyond artistry, is to function as a vehicle for scientific knowledge. “To be the truth-telling pen” might summarize the practice’s purpose, “observation” its focus; no detail, no matter how subtle, should be omitted from a scientific illustration. The practice also has much to offer “comparative research”, for which meticulous drawings of the subject, be it body parts or flora and fauna, are essential. A good scientific illustrator must be accomplished in the humanities, possess the humanistic concern of the anthropologist making “ethnographic

sketches,” and value both the arts and the sciences. Recent discoveries in China of early Buddhist scriptural drawings, paintings on mausoleum walls, and other architectural artifacts, stele inscriptions, and *jiehua* are all ideal source materials for scientific illustrations and academic research, and possess great value for decoding architecture.

### Three Points of View for Architectural Drawings

Transcending our limitations as humans requires that we transform ourselves into something else, like a bug, a fish, or a bird. Herein lies the illustrator’s trick for bringing architecture to life for the viewer and making it interesting by mixing things up. The following three points of view are common illustrator’s tools for capturing on paper the beauty they behold with their eyes.

Bird’s-eye view: soar above the human eyeline by imagining yourself as a bird or a passenger aboard a plane, or a hot air balloon, bringing into view a whole spread of buildings, their full layouts, and the most roofs possible at once. Up high, you can take in an entire building and its surroundings with a glance. When your subject is large and the aim is to capture both it and its relationship to its setting, this point of view should be your go-to.

Bug’s-eye view: bring the gaze to ground level to see what a bug sees. This perspective provides a full view of the subject from below – like lying on your stomach and pointing the camera up. Alternatively, moving your eyes as close as possible to what you are drawing will magnify everything to the scale a bug perceives it to be. Use this when a building’s best features are up high or there are specific fine details that need to be captured.

Fisheye view: like looking through a wide-angle lens, this point of view stretches a building’s form over a sphere, providing a view of multiple sides at once. It also makes vertical pillars arched, in a cartoonish take on the subject. Of course, deformed buildings have little genuine use from a research standpoint, however this perspective could be a great way of drawing the eyes and interest of children to architecture, perhaps with age-specific explanatory diagrams.

### Breakdown of Section Drawing Techniques

Horizontal-vertical	quarter-section	view
Horizontal thirds		
Horizontal		halves
Horizontal-vertical eighth-section view		
Full view		
Staircase cutaway		
Longitudinal half view		
S-section cutaway		
Longitudinal quarter view		

## Selecting the Most Informative Section View

Before getting started on a drawing, it could be helpful to refer to the “Breakdown of Section Drawing Techniques” above. It shows a variety of approaches and perspectives for performing a comprehensive analysis of a building, each of which gives a clearer look at certain special features or links between key areas. Since these section drawing techniques can generate a varied and quite comprehensive view of a building both inside and out, they are an effective tool for exhibiting unique architectural characteristics.

Architectural section drawings can take countless possible forms, but removing a wall or the roof are the most common approaches because they provide a direct look into the interior as is, permitting a highly detailed view of a subject. We say that the devil is in the detail, and that’s exactly where the wisdom in a building’s design and construction can be found. Details tell a thousand stories, so section views offer a rich and penetrating narrative. The biggest difference between a hand-drawn diagram and a photograph is their subjectivity. Photographs traffic in the objective, whereas the draughting artist holds the power to include what they like and remove what they don’t, giving them full rein to highlight a building’s most important features.

Architecture is man-made. It is the product of humans gathering various materials and combining them according to a plan. A section view can provide readers insight into the work, and mystery, behind that gathering process, and even give them room to imagine the construction process for themselves, a vital exercise for improving our understanding and enjoyment of architecture!

So, how should you dissect a building? In this book, I break down nine possible approaches, which I have applied to a variety of subjects; in each case, the approach I use depends on the building’s specific design features. Bear in mind that whichever one you choose, your drawing should exhibit the most impressive, important, or attractive parts of its subject. Only then can it tell all the stories the building contains. In other words, the more informative a section drawing is, the better.

## 35 Examples of Classical Taiwanese Architecture

### 1. Atayal Home, Alang Marosan Commune

Distinguishing features include: built half below-grade, a curved roof, resistance to the wind and cold, wooden slat walls above grade, and retainer walls made of large stones.

Time of construction: Unknown

Location: Originally located in Ren’ai Township, Nantou County (the subject is a replica of a building originally found in Formosan Aboriginal Culture Village, Nantou County, Yuchi Township)



The Atayal people in Taiwan predominantly live in the mountainous region of northern Nantou County. Their buildings adeptly combine timber, bamboo, and stone. Stones are stacked to form retaining walls that are reinforced with wooden struts. At ground level, the walls are built from logs laid horizontally atop each other and interlocked on the ends, making for a “log cabin”-style appearance, or a horizontally-stacked log construction. For the roof, large, slightly curved timber logs are used as beams, over which bamboo poles and thatched grass are placed.

Of all Atayal architecture, the deeply-buried homes in Alang Marosan Commune have received the most attention for their ingenious use of local topography. Wooden steps lead from their entrances down into the interior, which at first might seem inconvenient, but the logic behind the depth is clear, as Japanese naturalist Tadao Kano found in 1940. Having first deduced from the rarity of this kind of construction among the southern island peoples that it must be a very old design from mainland Asia, Kano identified its main strength to be temperature control: resistance to cold and preservation of warmth.

The Alang Marosan Commune residences are built into an arid mountain slope, so although they reach more than a meter underground, they are not damp inside. Another reason for their low internal humidity might be their stone retainer walls, which are secured with wooden stakes. The combination of these materials makes for a very sturdy structure. At that depth underground, a person feels they can almost hear the earth calling them or that they have been transported back to their mother’s womb.

Longitudinal half view

### **Section view of an Atayal home in Alang Marosan Commune**

This image shows how much lower the interior sits than the exterior, with several wooden steps at the entrance leading inside. The benefits of this half-buried construction include preserving heat in the winter and remaining cool during the summer. Inside, a timber-frame bed sits in each of the four corners, and at the center is the designated work area, where a fire pit could be installed for warmth and food preparation.

- 1) The roof is made of wood strips, timber planks, bamboo poles, and thatched grass.
- 2) Naturally curved, large timber roof beams.
- 3) “Log cabin”-style above-grade wall.
- 4) A retainer wall of stones laid in stretcher bond combined with plank posts form the frame.
- 5) The half-underground interior.
- 6) Fire pit for cooking and warmth.
- 7) Wooden beds in the four corners.
- 8) Space-efficient storage shelves hung above the bed.
- 9) Small window by beds.
- 10) Wood board door built into the long side of the home.
- 11) Steps between the interior and exterior.

## Variations between Atayal Residences

Of all the indigenous peoples in Taiwan, the Atayal occupy the largest area in the country. They mostly live in the northern mountainous regions between the altitudes of five hundred meters and a thousand meters. Qing dynasty literature refers to them as “Northern Barbarians” (*beifan*). They have settlements in Yilan County, Hualien County, New Taipei City, Taoyuan City, Hsinchu County, Miaoli County, Taichung, and Nantou. They build their houses on mountainsides, where the slope levels somewhat, to capitalize on the sloping terrain’s effectiveness at sluicing away water, thereby keeping their homes sanitary and clean.

A survey by Japanese scholars divides Atayal homes into four categories: those of the northern, eastern, and western styles, plus those of the central style into which the residences in Alang Marosan Commune fall. The styles each have a slightly different layout and structure, although they generally share a rectangular floor plan, with beds abutting the walls and small windows above them for light. The place of honor is located at the farthest point of the interior, chiefly reserved for the elder members of the family, while the area inside the entranceway is the dedicated women’s workspace.

*/ 1- Homes in Alang Marosan Commune sit over a meter deep beneath the ground’s surface.*

*/ 2- Timber posts reinforce the stone walls to make for a stable structure.*

### ***/ Section view of a home in Masitoban Commune***

*Located in Masitoban Commune, Ren’ai Township, Nantou County. Like in Alang Marosan Commune, this home represents the Atayal people’s central style of semi-burrowed residence.*

### ***/ Sketch of an Atayal home’s structure***

*Skilled craftsmen with bamboo poles, the Atalay people utilize the material in the construction of nearly every part of their homes.*

## Wisdom for Mountainous Living

Semi-buried Atayal structures have interiors that sit lower than the exterior ground level; some are further underground than others. Structurally, the beams and rafters are made of timber and bamboo. The walls are wrapped with wooden or bamboo slats – whole or processed – and thatched grass, while the roof is made either of thatched grass or strips of Taiwan cypress serving as tiles. A fire pit sits inside to keep out the cold.

Other essential Atayal buildings like storehouses tend to sit at around a meter tall; those that are constructed on stilts are much taller. These structures have sloping roofs to keep off rainwater. Where each of the four wooden stilts meets the building that they support, rat guards made of slightly curved wooden planks are fitted to stop rodents from entering the storehouse above. The walls are made of bamboo and stones from the local region. The bamboo serves as an exterior frame or paneling with which to hold the bulk of the wall – a hefty stack of large stones – in place. This method thickens the wall enough to be an effective guard against the cold. The roof, besides bamboo and thatched grass, sometimes includes extra bamboo poles for securing the

grass to the framework, or even hemp cord for binding the grass together, so that the winds of typhoon season are less likely to tear off the roof.

In addition, the Atayal often choose an area of high ground at the edge of their community to build a lookout platform. These platforms also stand on stilts, but these stilts are much taller than any used to support a storehouse, sometimes reaching two or even three stories tall. Simple stairs lead up to the platform where a lookout is ordinarily posted.

### **[Extended look] Atayal Home, Qalang Mb'ala Commune**

Although also the homes of Atayal people, from the outside the residences in Qalang Mb'ala Commune in Ren'ai Township, Nantou County look nothing alike those of the Alang Marosan Commune.

Homes in Qalang Mb'ala Commune sit level with the ground, and have an entranceway built into one short side. Their most unique features are the barrel roof made of large, bowed beams covered with reinforced grass thatching, and the half-moon cover of thatched grass over the entranceway, which provides shelter from the rain. The overall effect is impressive. Meanwhile, the single-room rectangular floorplan, the sturdy walls of horizontally-stacked logs supported inside and out with wooden posts, and the beds on four short posts in the corners are all features common to both the Qalang Mb'ala and Alang Marosan communes. Clearly, rather than stick to a single design, the Atayal people customize their homes to fit the setting.

### **Section view of a home in Qalang Mb'ala Commune**

The roof and part of the wall have been removed in order to show both the barrel roof and the walls of horizontally stacked logs as well as the entranceway space and interior setup.

Longitudinal quarter view

The roof, supported by curved wood beams, forms a half-moon cover.

In order to reinforce the roof's covering, superficial layers of thatched grass are bound together with hemp rope.

The bed stands flush with the interior wall. A nearby window can be opened to let in light. The rear of the interior space – the place of honor – is reserved for senior family members to use.

The walls are made of horizontally stacked logs in the classic style of a log cabin, with wooden posts on either side to hold them in place.

A rectangular floorplan with the entrance in the short side

Inside the entranceway is the dedicated women's work area.

*/ Interior of a Qalang Mb'ala home, with its arched roof visible.*

## [Extended look] Tao Home

Although one people settled in mountainous regions and the other along the coast, yet the coastal-dwelling Tao, like the Atayal, live in semi-subterranean homes. Despite their disparate settings, both have designed similar dwellings in order to adapt to the environment. Since early last century, when a Japanese anthropologist coined the name, the Tao have been commonly recognized as the Yami people. They live on *Âng-thâu-sū* (*hongtou yu*), or Orchid Island, off the eastern coast of Taitung County, and bear cultural similarities to the people of the Batanes archipelago in the Philippines. They are excellent craftsmen, as is evidenced by their *Tatala* boats. Most of their settlements dot the coastal slopes of the island, and a number of functional buildings, including their homes, boathouses, workshops, delivery rooms, verandas, and pig and chicken pens, have been structurally adapted to fit the sloped terrain. The verandas, in particular, stand high off the ground on stilts to afford residents a greater field of vision. When people head out on their boats to fish, their family can watch them from the platform.

To protect against high winds, their homes are built half-underground in a man-made recess around two meters deep, with only the grass-covered roof visible at ground level. The floorplan is rectangular, with an entranceway fitted into the long side and a deep-eaved porch. The front pitch of the roof is long, and the back short. The roof frame is made mainly of thick timber beams and supporting posts, reinforced by thinner pieces of wood. The large central post is regarded as the spiritual pillar. Divided into a front and back room, the interior flooring consists of wooden slats, with the rear area raised around thirty-five centimeters above the other and a section of earth left visible for storage. Wooden boards make up most of the walls, with vertically-halved bamboo poles fitted between each one to fill the gap. Another noteworthy feature are the shelves suspended beneath the ceiling for storing things out of the reach of rats – an ingenious use of space.

### Section view of a Tao home

A longitudinal section view cuts away half the building to reveal how the buried structure contours the terrain, how the levels of the interior floor are arranged, and how the materials and space are allocated inside.

#### Longitudinal half view

The internal framework is made of thick timber beams and supporting posts, while the walls mainly consist of wooden boards. The tallest, central post is known as the spiritual pillar.

#### Thatched-grass roof

Shelves are installed hanging beneath the ceiling for storage.

The rear floor sits around thirty-five centimeters higher than the front floor leaving a segment of exposed earth between the floorboards as a space for storage.

The front section of the interior has a wooden floor.

The building has a rectangular floorplan, with an entranceway in the lower long side, over which a deep-eaved porch extends.

To protect against the wind, the Tao home is built in a dugout recess around two meters deep.

### **3. Lee Family Estate, Luzhou**

Thirteen outer buildings surrounding five larger structures, with three connected courtyards. For protection against floods, brick columns and stone walls were used widely in its construction.

Time of construction: Reconstructed in 1895 (twenty-first year of the Guangxu era, Qing dynasty)

Location: No. 19, Lane 243, Zhongzheng Road, Luzhou District, New Taipei City

The Lee Family Estate in Luzhou belongs to the Duishan branch of the Lee family, who settled on and started to cultivate the lands of Luzhou around two centuries ago. A highly talented family, they put themselves to agriculture, commerce, medicine, and education, and in later generations some members even enlisted for the resistance efforts against the Japanese.

The low-lying region of Luzhou used to be frequently hit by floods. Stacked stone walls and brick pillars feature heavily as flood defenses in the construction of the Lee Family Estate, which came to completion in the early twentieth century. The building and its grounds are a clear product of the prevailing late-Qing trend for homes in northern Taiwan, which have a symmetrical layout along a central-axis. Arranging a residence in this way makes for a clear allocation of space according to family hierarchy – with the innermost areas belonging to the most senior members – an important principle of clan feudalism. The estate is unique, however, for one important reason: the inner row of buildings on its left and right sides mirror their respective outer row of buildings, forming a courtyard space between each wing and thereby giving the estate three collocated courtyards. It is the only residence of this kind in Taiwan.

The estate is oriented southeast and faces northwest, affording a view of the faraway Mount Kwan-in and Linkou Plateau. For the traditional family, daily life took place in the vestibule, living room, and ancestors' hall, all arranged along the building's central axis, as well as in the left- and right-side wings. A well in each courtyard on either side still provides drinking water today, a rare and therefore valuable treat to find nowadays in an old Taiwanese estate, as most of their wells no longer supply clean water.

Horizontal-vertical quarter-section view

### **Bird's-eye section view of the Lee Family Estate's residences**

"The residence consists of thirteen outer buildings surrounding five larger structures, with three courtyards and 102 doors." This is the best existing description of the Lee Estate's layout. The image above shows half of the estate with the roof removed, allowing a look at the arrangement

of rooms and how the various corridors intersect, which gives an idea of how centripetal communal living was in big families in old Taiwan.

- 1) Recessed entranceway
- 2) Screen wall
- 3) A round well, the main source of water inside the estate
- 4) The main hall for receiving guests
- 5) The rear central courtyard is paved in a spiral pattern and is positioned in front of the ancestral hall so as to echo the flat spaces found in front of ancient palaces.
- 6) The rear hall contains a shrine for ancestral worship at the memorial tablet inside.
- 7) First outer building
- 8) Water door
- 9) The mountain-facing outer building
- 10) Roofed veranda without supporting posts
- 11) Side courtyard
- 12) The building closest to the mountain sits on higher ground, which facilitates the flow of rainwater out of the estate's front.

### **A Family of Talents Artistic and Militaristic**

The Lee Family of Luzhou were industrious and frugal. Li Qingshui, a member of the family's second generation in Taiwan, built the estate in the early Xianfeng era of the Qing dynasty. In 1895, his seven sons jointly funded a thorough reconstruction. Work was completed in 1903, since which the residence has retained the same appearance. Two renowned figures from the family were Li Shuhua of the late Qing and Li Youbang of the Republic era, the former a literary talent, the latter a Brigadier-General. Li Shuhua was appointed an instructor of the prefectural academy by the Qing imperial court, a role for which he was posthumously conferred the honorable title of Grand Master of Forthright Service. While the country was under Japanese rule, Li Youbang worked closely with Chiang Wei-shui, Loa Ho, Wang Min-chuan, and Wenqing Lian of the "Taiwan Culture Association," and established the northern headquarters of the Taiwan Volunteers against the Japanese within his own family residence.

*/ 1- A square layout with three central buildings and six side buildings, arranged symmetrically to reflect Confucian principles.*

*/ 2- Constructed using a large number of stone slabs, brick columns, and other water-resistant materials to protect against the frequent flooding that Luzhou used to experience.*

*/ **Full bird's-eye view of the Lee Family Estate** Arranged in a unique three-courtyard layout with buildings on all sides of each courtyard and the gate tower positioned directly in front of the residence.*

*/ 1- The inner courtyards have brick flooring and are arranged to abide by the ancient fengshui theory of yangzhai, or "residences for the living".*

*/ 2- The buildings on the left and right wings served as the regular living spaces for the family, with wells in either courtyard for drinking water.*

### **A Fengshui-Inspired Estate**

Besides the traditional, symmetrical “zhao-mu” layout of Confucian homes, the Lee Estate also abides by certain cultural geomantic principles. First of all, it faces the shape-shifting Mount Kwan-in, which takes on a different appearance depending on the viewer’s perspective. Folk legend names the rock formation “brush holder mountain”, labelling it a symbol of good fortune in civil and literary affairs. Secondly, the Tamsui River passes by the east of the estate, flowing towards Guandu. Therefore, Mount Kwan-in could be considered the water’s gateway, which corrals environmental energies within Luzhou. The estate is also praised for crafting an aesthetic in line with the beauty of its natural setting. The oval-shaped pool in front of the residence serves to keep *qi* close, and to its north ridged fields follow one after another as far as the eye can see. In earlier times, the foot of Mount Kwan-in was visible from the estate’s doorstep across these level farmlands of green.

The *fengshui* diagram for the Lee Estate from the beginning of the nineteenth century, entitled “Lotus on the Water: The Old Minister Aids the Young Master”, is still available to read in the home. The latter half of its title indicates that the nearby, larger natural features promise a flourishing future for the estate and its land. The document explains that the estate “is oriented southeast [and] faces northwest”, its main hall and main gate line up with Mount Kwan-in, and it abuts Houping Mountain, which is ten *li* from “Pai-chih-po.” The diagram also notes that the site’s geomantic properties were “determined by Wu Shang of Pai-chih-po and confirmed via survey by Liao Fengshan.” “Lotus on the Water” refers to the pool in front of the residence, in which there is reflected an image of the distant Mount Kwan-in, as if in a mirror. At the time of the document’s creation, the site was considered to have excellent *fengshui*. For a historic residence of this interest to have preserved such valuable records and historical materials is a rarity.

The estate comprises three main buildings in the center, with six side buildings. The first main building consists of an entranceway five-rooms wide; the second a living room; and the third the ancestors’ hall. Three long, side buildings flank them either side. The third main building holds thirty rooms. Overall, the estate has fifty-four rooms, with around 142 windows and doors. Its most distinguishing feature is that the two rows of outer rooms on either wing of the estate do not face the central axis, but face outward, forming two courtyards which provide ample living space and wells for daily drinking water. In other words, besides the middle courtyard that sits on the central axis, the Lee Family Estate boasts two further courtyards, one on the left and one on the right of the axis. Its layout then is of three collocated courtyards, of which it is the sole example in Taiwan.

*/ 1- The roof frame is a simple timber structure, with a central supporting pillar made of brick. The color scheme matches that of traditional homes.*

*/ 2- The eaves over the portico of the main hall boast dougong.*



*/ Diagram of the main hall's roof-supporting brackets and truss* The main hall's entranceway has long eaves, under which the crossbeam extends in the shape of a curved edge blade and serves as a bracket for bearing the weight of the first purlin. The next purlin up, in between the first one and the column, is supported by a cross bracket and "chicken tongue," which transfer its weight to the crossbeam.

The timber components have faded from black to their natural color.

Extra purlins

Front purlin

"Chicken tongue"

Cross bracket

Crossbeam

Main bracket

Auxiliary bracket

Full bird's-eye view

### **[Extended Look] Ye Family Residence, Guanxi**

This residence, as an archetypal example of a northern Hakka courtyard home inspired by *fengshui* culture, makes for a helpful comparison with the residence of the Lee family, who were originally from Quanzhou.

Most mountainside or mountain-proximate settlements in Hsinchu are Hakka villages. On such hilly terrain, residences keep the mountain slopes at their rear and face the water, as *fengshui* design principles suggest: "Mountains at the back as pillows, water at the front as a mirror." Hakka homes in Guanxi mostly stand on small hillocks with a running stream nearby or a dugout pool in front. When Taiwan was an agricultural society, the pools were sometimes used for farming fish and, in the summer months, created a kind of microclimate. Such designs made smart use of the natural geography and environment.

### **A full bird's-eye view of the Ye Family Residence**

A bird's-eye view of the whole area encompasses eleven buildings. Two rows of buildings stretch along both wings. The roof is highest over the three central buildings and descends incrementally with each building removed from the axis. The symmetrical floorplan points to the Confucian hierarchy-based innerworkings of Hakka families. In one part of the outer building that runs longitudinally to the others, there is an area for keeping livestock or fowl. The original name for the area in front of the main hall was the "grain floor", where people would work or rest and during harvest season would leave grain to dry.



Recessed entranceway

Open-air, semi-circular space with pebble flooring, named a *huatai* (lit. birth nursery) behind the residence, intended to facilitate peace.

Main hall

The inner grounds, also called the grain floor.

Pond outside the entrance for rearing fish, relief from the summer heat, protection against fires, and its geomantic benefits.

Inner crossways building

Outer crossways building

Water gate serving as an entrance for the crossways buildings.