



STONE, WATER, AND MORTARLESS CONSTRUCTIONS: FRANK LLOYD WRIGHT AND THE PRE-COLUMBIAN INCA

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The affinities between a number of Frank Lloyd Wright designs and the architecture of Pre-Columbian Mesoamerican (Mexico, Guatemala, Honduras, Belize, and Western El Salvador) cultures such as the Maya, Zapotec, and Teotihuacan have been well established in the literature on Wright.¹ Scholars most often identify flat mansard roofs, small rectangular windows and doorways, textured and geometricized surface ornamentation, and the use of heavy, neutral-colored materials as the similarities between the architecture associated with these cultures and Wright's own work. Overlooked, however, are the resemblances between a number of Wright designs and the architecture of the Pre-Columbian Andes, especially the Inca, in the use of trapezoidal openings, canted walls, mortarless masonry, and the incorporation of building with water and living rock.²

The omission of the Pre-Columbian Andes in the Wright discussion can be explained, at least in part, by the dearth of scholars focusing on Pre-Columbian Andean art and architecture. Furthermore, Wright's approach to his sources is generally not straightforward; instead of precisely copying forms and motifs, he "digested" them.³ That is, rather than mimic the art and architecture he admired by incorporating exact features into his own designs, Wright internalized and often intellectualized his sources. This method often resulted in a design that "feels" Japanese, Pre-Columbian, or Native North American, for example, but eludes direct comparison and may or may not indicate specific influence. Wright, himself, was often frustrated by scholars' attempts to assign explicit sources to his designs, noting repeatedly that "resemblances are mistaken for influences. Comparisons have been made odious where comparison should, except as insult, hardly exist."⁴ To present a similar, yet more specific example, when discussing the inspiration for his home and studio in Scottsdale, Arizona—Talesin West (1937–59)—Wright noted that his ideas originated from "the same source as the early American primitives," adding, "there are certain resemblances, but not influences."⁵

Whether general resemblance, as Wright insisted, or literal influence, as numerous scholars have asserted, is not, however, the focus of this article. Wright held broad interests in a range of cultural traditions, and he regularly denied the existence of any exact quotations from those traditions in his own work. Instead of parsing out the degrees of similarity



to or removal from source to appropriation by Wright, we aim to highlight the presence of Inca characteristics in a number of Wright designs. The purpose, then, is not to preclude previous scholarly claims for the presence of other traditions, but to add the Inca to this discussion so that we may more fully and accurately understand Wright's architectural aesthetic.

To begin, we provide a brief overview of the major and most common characteristics of Inca architecture, as it was understood during Wright's time. This will set the stage for the reader to more fully grasp Wright's knowledge of and admiration for Inca architecture through major literary and documentary sources as well as exhibits at world's fairs and museums. For those not already familiar with Inca building forms and construction techniques, we also provide a brief overview of Inca architecture, as it was known during the years Wright was practicing. During these early decades of the twentieth century, when many architects in the United States, including Wright, were attempting to develop a uniquely American architectural aesthetic, a significant number took inspiration from indigenous American prototypes, which were viewed as ancestral and, therefore, belonging to the Americas. Our discussion of the resultant "Maya Revival," or more accurately, "Neo-Prehispanic" style that flourished beginning in the late nineteenth century through circa 1940 places Wright within a context of his peers and helps gauge how Wright's internalization of these architectural traditions compares to others at the time.⁶

Wright articulated, sometimes quite self-righteously, his opinions about what constituted "good" architecture. Inca architecture, in many ways, matched Wright's convictions that building and landscape should be closely related, for example, or that stone was the most appropriate medium for architecture. Inca architecture, too, provided a successful example of earthquake resistance, a topic that consumed Wright for much of his early-to-mid career. To facilitate a more meaningful discussion of these points, we provide a more in-depth discussion of specific Inca resemblances in Wright's works, including the 1920s textile concrete block residences (especially the Charles Ennis-Brown and Alice Millard houses), the house commissioned by Edgar J. Kaufmann ("Fallingwater") in Mill Run, Pennsylvania (1935–39), and Wright's own Taliesin West. The conclusion elucidates the overarching argument here, namely that a number of Wright's designs resemble Inca architecture.

The Inca and Their Architecture: A Brief Introduction

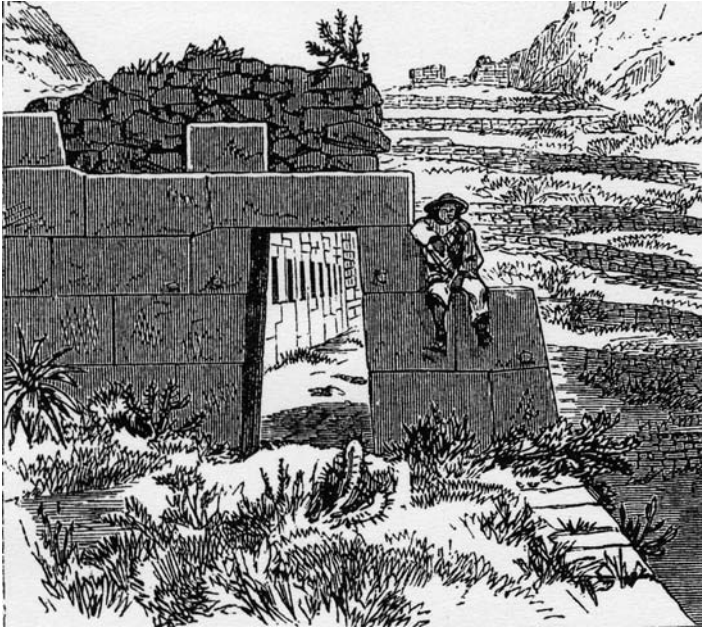
The Inca (c. 1430–1532 AD) were the last major indigenous culture in the Andes mountain area of South America before the Spanish arrived in 1532. The Pre-Columbian Andean region—the long, narrow strip of land along South America's west coast extending from today's southern Colombia to northern Chile—encompasses the high, snowy Andes, some of the world's driest deserts, and the Amazon jungle. A land of topographical extremes, this region also suffers frequent natural disasters such

as earthquakes, floods, and mudslides; these events demanded sophisticated survival techniques including architectural adaptations designed to resist damage. Elite Inca stone architecture, created for the ruling class, was built to withstand earthquake damage. This resilience is usually attributed to a double-walled construct with stones anchored together internally, not with mortar, but by shaping each to fit into its neighbor, allowing the stones to shift and move when shaken before settling back into place. Though this precision-fit technique is the most famous element of Inca stonework, there were other construction systems used in elite architecture.⁷ At Ollantaytambo in Peru's Sacred Valley near the Inca capital of Cusco, for instance, metal clamps and grooves were also employed to secure the stones of some buildings.⁸

Aside from its ability to withstand earthquakes and other natural calamities with its fine mortarless stonework, elite Inca architecture is also striking for its frequent siting with spectacular views of particular features in the surrounding landscape, a landscape imbued with deities and other supernatural forces.⁹ With constant reminders of the power and presence of nature throughout this region, the Inca (and previous cultures in the Western Andes Mountain area) developed a cosmology that ordered this physical world.¹⁰ Inca rulers, considered divine, created an aesthetic that highlighted the complementary relationship they saw between natural and human worlds. Water channels, fountains, and baths brought water in and out of earth throughout many sites; large stones remained in their natural locations and were used in foundations, walls, and left in interior spaces where the Inca built around them; cave openings were amplified and/or carved; and impressive views of surrounding mountain peaks (called *apu* and thought of as protectors) were emphasized through placement of buildings.¹¹

Despite the complex integration of landscape and building by the Inca, most of their buildings are somewhat simple, one-room, rectangular masonry structures with trapezoidal openings and niches, gabled roofs, canted walls, and plain, austere stone facades, some with impressive precision-fit stonework (**Figure 1**). This architectural uniformity created a distinctive style throughout the empire, no matter how far afield the buildings were placed from Cusco. Nineteenth century explorer, Ephraim George Squier observed this when he wrote, "Wherever [Inca architecture] was introduced among the nations of the coast and other parts of the empire, it may be at once recognized."¹² Minimal variation in Inca architecture also served a pragmatic purpose: it helped facilitate the *mit'a* labor taxation system that required citizens from all over the Andean region to participate in various tasks, including construction projects, for short periods of time. Standardization in architecture would have made it possible for groups of temporary workers to join in at any stage of the building process. This consistency of design is symptomatic of a greater political purpose concerned with a spreading empire.

Figure 1. Ephraim George Squier, Ollantaytambo Gateway



Source: Inca, Doorway, Ollantaytambo, Peru, c. 1440–1532 AD. From Ephraim George Squier, *Peru: incidents of travel and exploration in the land of the Incas* (New York: Harper & Bros., 1877), 496.

Wright’s Admiration of Inca Architecture

Wright’s knowledge of and admiration for Inca architecture is made explicit in his own writings about the Inca. The oft-quoted passages from his 1957 autobiography, *A Testament*, for example, list several cultures by name, including the Inca: “As a boy, primitive American architecture, Toltec, Aztec, Mayan, Inca, stirred my wonder, excited my wishful admiration;” and, “The Incas, the Mayans [sic], even the Japanese—all were to me but splendid confirmation. . . . At that early day I was thrilled by Mayan, Inca and Egyptian remains, loved Byzantine.”¹³ A more extensive description reveals more specifically what he admired about Inca architecture, though he refers to it as “South American”:

This magnificent masonry was architecture beyond conceivable human need; truly monumental. Monuments to the gods of temporal power were laid out and built upon the great man-made stone-paved earth-levels of South American plateau. Architectural grandeur was thus made one with the surrounding features of mountainous land; made by wasting away the mountains; mountains moved at will by the simple persistent might of the human

being multiplied, a man's own strength multiplied by the strength of multitudes of his kind."¹⁴

Inca architecture was best known from the earliest descriptions for its monumental, mortarless stone masonry and its relationship to the surrounding Andes mountains. No other architecture of South America matches this description.

While there is no evidence that Wright traveled to the Andes himself, his more extensive description of Inca architecture highlighted in the above quote demonstrates a more nuanced understanding of Inca architectural aesthetics, however, not only in the monumental use of stone, but in the more conceptual relationships with the surrounding landscape.¹⁵ It would be helpful to understand how and from what sources Wright might have acquired this knowledge as it would aid in identifying resemblances to the Inca in Wright's work. Yet archival records have failed to produce holdings on Inca art and archaeology in Wright's personal libraries and no relationships to clients or anyone else well versed in firsthand knowledge has been revealed from careful scrutiny of Wright's correspondences or archival records. Given the 1914 fire at his Wisconsin Taliesin home and all the years that have passed between then and now, this is not all that surprising, however. In the absence of specific documentary connections, then, we turn here below to popular and widely disseminated documentary and visual sources—namely best-selling books and major news articles—that Wright and most members of society were likely to have seen, as well as those world's fairs and museums with Pre-Columbian exhibits for which we do have documentary evidence that Wright attended.

Though a number of sixteenth and seventeenth century Colonial-era publications include descriptions of Inca architecture, it was Hiram Bingham's highly publicized 1911 "discovery" and subsequent excavations of the Inca site Machu Picchu in the south central highlands of Peru, and the attention he garnered for his work throughout this area of Peru, that created widespread familiarity with Inca architecture in the United States.¹⁶ In addition to vivid written descriptions, Bingham also included photographs of Machu Picchu's architecture in both books and such publications such as *The National Geographic Magazine* and *Harper's Magazine*, with particular focus on the integration of natural rock outcropping with carved or cut stone.¹⁷ Bingham's writings highlight characteristics of elite Inca architecture (precision-fit stones "most beautifully cut and fitted together without the use of cement," the incorporation of seemingly untouched rock, and the use of extensive hydraulics) that previous scholars had described and illustrated, many of which he cited.¹⁸

One such work for which Bingham consulted was William H. Prescott's (1796–1859) *History of the Conquest of Peru* (1847), which includes detailed textual descriptions of numerous buildings and monuments.¹⁹ A historian who never ventured to the Andes himself but who drew his information mainly from sixteenth and seventeenth century chronicles by Spanish and



Colonial-era writers, Prescott pays particular attention to the “gorgeous temples” of the Andes and provides an in-depth account of the most sacred Inca building in Cusco, the Qoricancha, noting the “glory” of its fine stonework.²⁰ The impressive size and shape of the stone masonry buildings held together without mortar greatly impressed the chroniclers and, by extension, Prescott who commented that these were “accommodated to the character of the climate, and [were] well fitted to resist those terrible convulsions which belong to the land of volcanoes.”²¹ He also marveled at the enormous boulders used to construct Inca walls at the site of Sacsayhuaman, just outside Cusco that were “hewn from their native bed and fashioned into shape, by a people ignorant of the use of iron some distance away.”²²

Another source mentioned by Bingham was the 1877 illustrated travel account by Ephraim George Squier (1821–1888), *Peru: Incidents of Travel and Exploration in the Land of the Incas* in which he, too, provided descriptions and numerous illustrations, not only of Sacsayhuaman, but of numerous archaeological sites throughout Peru and Bolivia.²³ Trained as an engineer, Squier was especially interested in architecture, and this publication on Peru was generally considered the quintessential resource on Inca architecture at that time. Squier’s descriptions helped promote the sites he visited, which today are among the most famous Inca ruins, including Sacsayhuaman, Ollantaytambo, and Pisac. Like Prescott, he, too, marveled at the stability and durability of these structures, attributing this to Inca architects’ “accuracy of their stone-fitting without cement.”²⁴ Squier also mentions a few exceptions to the mortarless construction of elite Inca architecture, including Ollantaytambo, where he describes the stones as having been “fastened together by bronze clamps, interfitting grooves and projections, and by other purely mechanical devices, bearing in no way on the question of the use of mortar.”²⁵

In addition to the publications by Prescott and Squier, Bingham also mentioned works on Inca architecture by Charles Wiener and R. Clements Markham. Wiener’s 1880 *Pérou et Bolivie. Récit de voyage suivi d’études archéologiques et ethnographiques et de notes sur l’écriture et les langues des populations indiennes* includes more than six hundred illustrations of sites in Peru and Bolivia, detailing a number of Inca stone- and waterworks.²⁶ Markham’s 1912 *The Incas of Peru* was one of several books the author wrote in which he, too, describes and illustrates the buildings of the Inca—here, the stonework at Sacsayhuaman, Cusco, and Pisac.²⁷

Generally speaking, then, these early descriptions of Inca buildings cast them as ruined marvels with authors pointing repeatedly to the size of the stones used in these constructions, held together with a mortarless interlocking system that was credited with creating an earthquake resistance. Additionally, many authors mentioned the striking surroundings of the Andes mountains and the vantage points of these vistas from various Inca sites.

In addition to these written sources, people in the United States, including Wright, could have seen originals and casts of Pre-Columbian works at many world's fairs, expositions, and museums, beginning with the 1893 World's Columbian Exposition in Chicago.²⁸ Marking the 400th anniversary of Columbus's arrival in the Western hemisphere, the fair celebrated U.S. history and progress. As a point of comparison, the fair assembled in one area of the fair an unprecedented number of exhibits related to so-called "exotic" cultures, from artifacts to dance performances to temporary villages housing actual indigenous peoples. These all underscored an idea of "universal brotherhood," that further posed the civilized "us" versus the exotic, yet savage, "them."²⁹ This grouping sets up a Western-oriented dichotomy, yet cultural designations were adhered to which shows one level of discrimination between peoples. Though separate and distinct, the Pre-Columbian exhibits from both Mesoamerica and the Andes were juxtaposed in the anthropological section with one promoting the other, in a sense.

While outdoor Maya exhibits at the Chicago fair featured quite dramatic architectural examples in life-size casts that had been taken from buildings on Mexico's Yucatan Peninsula, Pre-Columbian Andean architectural examples appeared predominantly in two- and three-dimensional depictions on stone and ceramic vessels and other such portable objects (often labeled as "Inca" though over time many were re-assigned more accurate cultural designators).³⁰ Wright, living in Chicago during the set up and duration of the exposition, assisted with the design of Dankmar Adler and Louis Sullivan's Transportation Building at the fair and was therefore a frequent visitor.³¹ Given his self-proclaimed interest in Inca and Maya cultures, it seems reasonable that he would have visited the Pre-Columbian section of the fair, though no documentary evidence of such specific visits exists.

In addition to the Chicago exposition, Wright attended at least two other world's fairs with exhibits of "Inca" material—the 1904 Louisiana Purchase Exposition in St. Louis and the 1915 Panama-California Exposition in San Diego (not to be confused with the Panama-Pacific International Exposition in San Francisco of the same year)—both of which included works from the Pre-Columbian Andes.³² The photographs held in the National Anthropological Archives of the Smithsonian Institution suggest that the Andes exhibits at the 1904 exposition, like those at the 1893 World's Columbian Exposition, consisted mainly of ceramics and other portable objects displayed in the same general area as the Mesoamerican works and models. The 1915 exposition, however, saw greater representation of the Andes; a number of skulls were on view, as well as a more sizeable collection of ceramics.³³ These displays of actual objects were also accompanied by exhibits demonstrating Pre-Columbian methods of making ceramics in both the Andes and Mesoamerica. Additionally, modern friezes and murals of both Andean and Mesoamerican subjects by such artists as Sallie James Farnham, Jean Cook-Smith, and Carlos Vierra



depicted Pre-Columbian topics rendered in European styles.³⁴ The world's fairs and expositions brought even greater awareness of and interest in Pre-Columbian cultures in general, which included the Inca.

Just as the Field Museum in Chicago inherited many of the exhibits from the 1893 exposition, the closing of other fairs saw the transfer of many of the materials to more permanent venues in nearby museums. The collections of the San Diego Museum of Man, for example, were initiated after the close of the 1915 San Diego exposition closed. Other anthropologically based museums followed suit soon thereafter, exhibiting Pre-Columbian works by about the first decade of the twentieth century. By 1911, for example, the Pre-Columbian Andes was represented at New York's American Museum of Natural History and Washington D.C.'s National Museum (today's National Museum of Natural History of the Smithsonian Institution). Exhibits from the Andes typically included mummies as well as a variety of ceramics, textiles, stonework, and metalworks.³⁵ Wright, however, cannot be placed with certainty at any of these museums. The greater point, however, is that it was becoming commonplace to include the indigenous cultures of the Americas in the major museums, an indication of the degree to which they were reaching general American consciousness.

Neo-Prehispanic Architecture: A U.S. Context

Just as indigenous American material began to be exhibited in many of the major museums, artists and architects working in the United States began drawing from the artforms of Pre-Columbian cultures of Mexico, Central-, and South America for inspiration in their own works. A minor style of architecture—the Neo-Prehispanic—took hold through circa 1940. The first unmistakable use of such Pre-Columbian elements in a U.S. building is the 1910 Pan-American Union (today, Organization of American States) headquarters in Washington, D.C., designed by Albert Kelsey and Paul P. Crét. To illustrate, quite literally, an organization whose aim it was to bring together all peoples of the Latin American countries, the architects included motifs and designs from a variety of peoples and time periods including the Maya, Zapotec, and Aztec of Mesoamerica as well as Tiwanaku and Chimú of the Andes.

Once the Pan-American Union headquarters opened its doors in 1910, the Neo-Prehispanic style gained currency, reaching its peak in the 1920s in Southern California before spreading throughout much of the contiguous United States during the 1930s.³⁶ The style encompassed such theme theaters and hotels as the Aztec Hotel in Monrovia, California (Robert B. Stacy-Judd, 1925), Aztec Theatre in San Antonio, Texas (Robert Kelley, 1926), Mayan Theatre in Los Angeles (Morgan, Walls and Clements, 1927), Fisher Theatre in Detroit, Michigan (Graven and Mayger and Albert Kahn, 1928), and the Mayan Theater in Denver, Colorado (Montana Fallis, 1930), to name a few. It was not limited, however, to these over-the-top, all-encompassing environmental programs, as the Neo-Prehispanic style was also employed in more subdued venues, such as the Aztec Ballroom in the

President Hotel in Kansas City, Missouri (Shepherd and Wiser, 1926) as well as a number of residences, especially in Southern California.³⁷ With the onset of World War II and changing aesthetic tastes, the style waned around 1940.³⁸

Wright: In Pursuit of an American Architecture

Wright, whether intentionally or not, participated in the Neo-Prehispanic style. As has been well examined by scholars, the design philosophy Wright came to adopt was informed by complex beliefs about architecture's relationship to nature as well as its moral role in society.³⁹ These two notions complemented one another as, generally speaking, he considered designs based in nature to be (morally and aesthetically) "good," and as such, able to help reform modern social ills. This ethos aligns with the ideals of the Arts and Crafts movement, within which a number of scholars have placed Wright.⁴⁰ In Wright's day, "primitive" peoples such as the Inca were idealized as purer and closer to nature, strongly linked to the land. That Wright also saw this connection is evident in a number of his writings. In a passage in *A Testament*, for example, he wrote: "These initial buildings were made to declare and express the affinity not only of man's life to his ground, but of the ground to the nature of the man who lived upon it."⁴¹

An important motivator for the architects who turned to Pre-Columbian prototypes for their U.S. buildings was the conviction that the United States needed its own architectural aesthetic, separate from Europe. Many of the practitioners of the Neo-Prehispanic style viewed Pre-Columbian cultures (and their architecture) as ancestral to the United States. These attitudes, perhaps strange to us today who trace these sorts of connections primarily through genealogical or cultural constructs, demonstrate a primacy of geography in regards to the roots of architectural aesthetics, common to the time. These architects saw an appropriateness in the use of certain motifs and forms based on the physical conditions of a place (light and shadow, climate, etc.), which according to them, encompassed the entire Western hemisphere. So the ornamental and highly decorated facades of the "ancient" Maya would be appropriately adopted for buildings in the United States; both were in the Western hemisphere, distinct from Europe. One of the main proponents of the Neo-Prehispanic style, architect Alfred C. Bossom, for example, articulates these ideas in his 1934 book, *Building to the Skies: The Romance of the Skyscraper*:

Now in North America the light is particularly hard and white and the shadows uninteresting. The Mayans in Mexico accordingly evolved an architecture of simple surface decorations with no cornices but with a strong emphasis on ornamented angles to form a towering silhouette. The designers in Chicago and New York, working under identical conditions of light, did the same. It was almost a law of architectural necessity that the Americans in stretching their



buildings skywards should come to use the same treatments of flat surfaces, set-backs and ornamented silhouettes.⁴²

Wright's interest in the Inca can be aligned with his attention to Non-Western cultures in general, and particularly to Japanese, Native North American, and Pre-Columbian. As Wright wrote in *A Testament*, "The only genuine culture is indigenous culture."⁴³ This statement reveals the common tendency at the time to conflate different Non-Western peoples, while idealizing "them" as free from the corruptions of modern industrialized society, closer to nature and therefore somehow more "authentic." From the Zapotec and Maya of Mesoamerica to the Inca of South America, Pre-Columbian peoples were categorized, more or less together as one, and fit into a number of architects' ideals (including Wright's) concerning the development of a uniquely American aesthetic. As early as 1908, Wright wrote:

In the hope that some day America may live her own life in her own buildings, in her own way, that is, that we may make the best of what we have for what it honestly is or may become . . .⁴⁴

While Wright recognized certain affinities between some of his own buildings and those of the "ancient Americans," he differed from many of his contemporaries in his convictions that architectural aesthetics belonged to both their own place and time, which helps explain his abhorrence to copying forms. To Wright, ancient architecture—whether it be Pre-Columbian, Native North American, or, especially, Classical Greek and Roman—was not an appropriate prototype for modern U.S. architecture. In a passage in *A Testament*, Wright notes that other cultures and times produce different approaches to or functions of architecture that are (or should be) separate from modern architecture:

The ancient American architectures of the Inca, the Mayan and the Toltec are lying centuries deep buried in the earth where ages ago instead of the free soul of man, the cosmic-order of sun, moon and stars inspired primitive man to level mountains and erect great temples to his material power. Again in America we erect temples but this time not so much to the mystery of great terrestrial or cosmic forces as to the interior or spirit-power of manhood as released by American democracy and its sciences. How much greater is this new expression of the soul of man! A new light may shine from every edifice built by the human mind.⁴⁵

Wright expounded on this further in a letter he wrote in response to Dimitri Tselos's 1953 seminal article, "Exotic Influences in the Architecture of Frank Lloyd Wright," which suggested Pre-Columbian influence in certain Frank Lloyd Wright designs:

Had I not loved and comprehended pre-Columbian architecture as the primitive basis of world-architecture, I could not now build

as I build with understanding of all architecture. Only with that understanding could I have shaped my buildings as they are. Yet, of all ancient buildings, wherever they may stand or whatever their time, is there one of them suitable to stand here and now in the midst of our time, our America, our machine-age technique? Not one.⁴⁶

Despite his clear rejection of “ancient buildings” within a modern setting, he simultaneously recognizes his own debt to the “primitive basis” of Pre-Columbian architecture, though superseding it with modern techniques and materials.

Like Arts and Crafts practitioners, Wright developed strong opinions about the choice of building material and how (or if) buildings were ornamented. Concrete, for example, was, to Wright, a “humble,” even base, material until it was patterned—especially those that emulated nature—elevated its worth.⁴⁷ Wright valued stone, on the other hand, for its age, position in nature, and ability to withstand disintegration over time. As he described in his April 1928 article for *Architectural Record*:

Stone is the oldest of the architectural materials on record, as to form, except as stone itself embodies earlier wood-forms. So from Stonehenge to Maya masonry—the rude architecture of the Druid-Bards of whom Taliesin was one, down the ages to the intensely implicated and complicated tracery of the Goths—where stone-building may be said to have expired—stone comes first.⁴⁸

Further in the same article, he discusses the stone architecture of the Maya in relation to the landscape:

The Mayas used stone most sympathetically with its nature and the character of their environment. Their decoration was mostly *stone-built*. And when they carved it the effect resembled naturally enriched stone surfaces such as are often seen in the landscape.⁴⁹

Surviving elite Inca architecture is also made predominantly of stone. That Wright recognized this is evident in his descriptions in his 1957 autobiography of “Maya, Inca, and Toltec” architecture as “mighty, primitive abstractions of man’s nature”. Of these structures he wrote:

Those great American abstractions were all earth-architecture: gigantic masses of masonry raised up on great stone-paved terrain, all planned as one mountain, one vast plateau lying there or made into the great mountain ranges themselves; those vast areas of paved earth walled by stone construction. These were human creations, cosmic as sun, moon, and stars!⁵⁰

Wright and the Andes: A Dialogue with Nature

The predominant aspects of Inca architecture that resonated with Wright’s building philosophies include its relationship to the landscape,

Figure 2. Hiram Bingham, Observatory, Machu Picchu



Source: Inca, Observatory, Machu Picchu, Peru, c. 1450 AD. From Hiram Bingham, “In the Wonderland of Peru” *The National Geographic Magazine* 24, no. 4 (April 1913), 485.

the use of stone as a main building material, and its earthquake resistance.⁵¹ Inca architects worked with the land—as evidenced at such sites as Pisac, Ollantaytambo, and Machu Picchu—building repeating terraces that highlight contours of hills and mountains. They also often incorporated natural or “living” rock as well as water in both interior and exterior spaces, and aligned windows and doorways with advantageous views of mountain peaks and other surrounding features (Figure 2).

Shortly after the 1893 World’s Columbian Exposition in Chicago, Wright’s designs, however subtly, began to reflect the first resemblances to Pre-Columbian, and specifically, Maya, architecture. The exterior façade of the studio he added to his home in Oak Park, Illinois (1895–98), for example, resembles a “generic” Maya structure, featuring a heavy, flat roof and small vertical openings.⁵²

A more explicit example of Maya presence can be found in the house Wright designed for Aline Barnsdall (known as the Hollyhock house) in

Los Angeles (1917–19), which Barbara Braun has convincingly compared to Maya styles in the Peten area of Guatemala and to the Temple of the Sun at Palenque, Mexico.⁵³ She identifies the usual similarities: flat mansard roofs, small vertical openings, and the “heavy” walls that, like many Maya Yucatan structures, are slightly angled outward at the top. Adding further to the suggestion of a Maya building is Wright’s choice of ornamented concrete for the façade, which provides the heaviness as well as neutral earthen tones reminiscent of Maya ruins.⁵⁴ Wright began the Hollyhock design just two years after his visit to the 1915 San Diego fair, where he had again had the opportunity to see Maya architecture on exhibit, including three-dimensional models of the Temple of the Sun (also on display at the 1904 Louisiana Purchase Exposition).⁵⁵

Just slightly later than the Hollyhock, Wright began to develop his textile concrete block system for the house he was designing for Alice Millard (“La Miniatura”) in Pasadena, California, built in 1923.⁵⁶ In Wright’s *An Autobiography*, he writes, “Gradually I unfolded to [Alice Millard] the scheme of the textile block-slab house gradually forming in my mind since I got home from Japan.”⁵⁷ This early prototype consisted of two rows of concrete blocks laid in a bed of mortar—plain for the interior, decorated for the exterior—that interlock. Flanged edges on the patterned blocks fit into cavities on the interior blocks. Within a few months of the development of this construction technique, Wright had eliminated the mortar and introduced a system of interlocking interior grooves with metal rods woven together, like the warp and weft threads of a textile.⁵⁸ He went on to employ this textile concrete block design in other residences such as the John Storer House in West Hollywood (1923), the Charles Ennis-Brown House in Hollywood (1924), and the Freeman House, also in Hollywood (1924).⁵⁹

This interlocking interior system of mortarless masonry is reminiscent of description after description of earthquake-resistant Inca architecture. Wright spent years, from the late 1910s to 1920s, studying and thinking about earthquakes and their effects on buildings when he worked on a number of commissions in high frequency earthquake zones. One of the most important of these in terms of scale and publicity was his Imperial Hotel in Tokyo, Japan, which he began working on in earnest in 1917. Of the design process of the hotel, he wrote:

The terror of the temblor never left me while I planned the building nor while, for more than four years, I worked upon it. . . . Because of the wave movements, deep foundations like long piles would oscillate and rock the structure. . . . Why, not, then, a building made as two hands thrust together palms inward, fingers interlocking and yielding to movement—but resilient to return to original position when distortion ceased? A flexure—flexing and reflexing in any direction. Why fight the quake? Why not sympathize with it and out-wit it?⁶⁰

Wright's answer to the ever-present earthquake threat at the Imperial Hotel was to create flexibility within the structure through an arrangement of cantilevers for the floors, rather than carrying floors through walls.⁶¹ Just before the newly designed hotel was scheduled to open its doors, these ideas about earthquake resistance were dramatically tested. On September 1, 1923, Japan's Great Kanto earthquake, measuring 8.3 on the Richter scale, devastated Tokyo. Wright, who was in Los Angeles when the earthquake struck, received a telegram ten days later that said: "Hotel stands undamaged as monument of your genius hundreds of homeless provided by perfectly maintained service congratulations."⁶² To Wright's enormous relief, the hotel had survived.⁶³

Given Wright's preoccupation with earthquake resistance, it is curious that he did not continue wholeheartedly with this system, repeating it only once.⁶⁴ Instead, he focused attention on an altogether new construction method, the textile concrete block, which though designed largely for an earthquake-prone area—greater Los Angeles—seemed less to do with earthquake resistance than reducing "all complications, all needless expense of the treacherous and wasteful building system," and his desire to eliminate the need for a specialist.⁶⁵ While in Tokyo, flexibility through the cantilever system had been the key to earthquake resistance for the Imperial Hotel; in California, the desire for flexibility led Wright to concrete, though in its undecorated form, he saw it as the most humble of building materials.⁶⁶ The malleability of concrete allowed Wright to create standardized blocks that could interlock behind their faces like a woven textile. That they did not require mortar allowed them to shift and move during an earthquake before settling back into place, much like elite Inca masonry. Wright wrote in his *An Autobiography* about the textile concrete block system he developed:

At last, here I was grasping the near-end of a great means to a finer order. . . . Standardization *was* the soul of the machine, and here I was the Weaver taking it as a principle and knitting a great future with it. Yet, crocheting with it a free masonry fabric capable of stunning variety, great in architectural beauty. . . . "The Weaver" concentrated on other studies and drawings to carry the idea further.⁶⁷

In the most mature form of the textile concrete block system, Wright inserted metal bars into grooves that wove one block to the next to bolster the strength of the block and allow a mortarless system. The use of grooves and metal in a construction that did not require mortar is, of course, reminiscent of Squier's descriptions of Inca architecture at Ollantaytambo, Peru.

Fallingwater and the Andes

Among the more striking of Wright's designs that literally combines nature with building, is the house he designed for Edgar J. Kaufmann in Mill Run, Pennsylvania ("Fallingwater"), which was built in 1938

Figure 3. Fallingwater



Source: Frank Lloyd Wright, Edgar J. Kaufmann residence (“Fallingwater”), Mill Run, PA, 1938 (photo by Ruth Anne Phillips; with permission of the Western Pennsylvania Conservancy).

(**Figure 3**). Here, Wright not only integrated the waters of Bear Run into the house, but again and again brought house together with both natural-looking (“living”) stone and water.⁶⁸ He left large, living boulders in place in both exterior and interior spaces in ways strikingly similar to examples in Inca architecture, particularly among the highly publicized “Sacred Valley” Inca sites such as Ollantaytambo, Pisac, and Machu Picchu (**Figure 4**). At Fallingwater, a large boulder on the exterior corner, near the cantilever that extends over Bear Run, for example, abuts the foundation in a way that is reminiscent of a similar tendency in Inca architecture as illustrated by Bingham and others (see **Figure 2**). A distinctive joint appears where rock meets the formed masonry blocks that make up the walls of both Fallingwater and the Inca structure. Several other such examples of natural rock joining formed masonry exist at Fallingwater such as on the exterior near the cantilever of the main house and in the interior “meditation corner.”

Perhaps the most arresting examples of natural-looking rock at Fallingwater, however, are the large boulders within the interior, such as those that comprise the floor and surround the fireplaces and hearths in the family room of the main house and in the guesthouse, as well as in and

Figure 4. Interior basement living rock w masonry, Fallingwater



Source: Frank Lloyd Wright, Fallingwater, Mill Run, PA, 1938, “living” rock meeting masonry in basement underneath kitchen (photo by Ruth Anne Phillips; with permission of the Western Pennsylvania Conservancy).

around the kitchen (**Figure 5**). The Inca, too, left large boulders in place within interior spaces as at a number of sites, including Pisac, where one example shows a large stone surrounded by a finely carved Inca masonry wall (**Figure 6**).

Just as stone is an integral part of the Kauffman house design, so, too, is water. The dramatic waters of Bear Run rushing under the house are complemented by collected, trickling, and canalized water throughout both house and grounds in a number of pools, fountains, water channels, spouts, and drains that resemble the types of Inca waterworks found and described in the early accounts. Early publications on Inca architecture emphasize the hydraulic accomplishments of Inca engineers and builders, paying particular attention to baths, fountains, water drainage, and channeling. Bingham, Wiener, and Squier, for example, all remarked upon and illustrated Inca fountains, baths, channels, and drainage systems at a number of sites.⁶⁹ One example at Fallingwater—Wright’s rectangular fountain near the entrance door to the main house, built of field stones and fed with a single spout—begs comparison with an illustration in Charles Wiener’s 1880 *Pérou et Bolivie* of a rectangular Inca fountain or bath, built with field stones, and fed with a single wall spout (**Figures 7 and 8**).⁷⁰ Again, it is likely that Wright was familiar with Wiener’s work through mention of it in Bingham’s accounts detailing his excavations at Machu Picchu.

Figure 5. Interior, Fallingwater



Source: Frank Lloyd Wright, Fallingwater, Mill Run, PA, 1938, interior floor fireplace (photo by Ruth Anne Phillips; with permission of the Western Pennsylvania Conservancy).

From nearly all vantage points of the main and guest houses at Fallingwater, one not only sees, but hears, water. Wright described his intention to make sound part of the experience of Fallingwater:

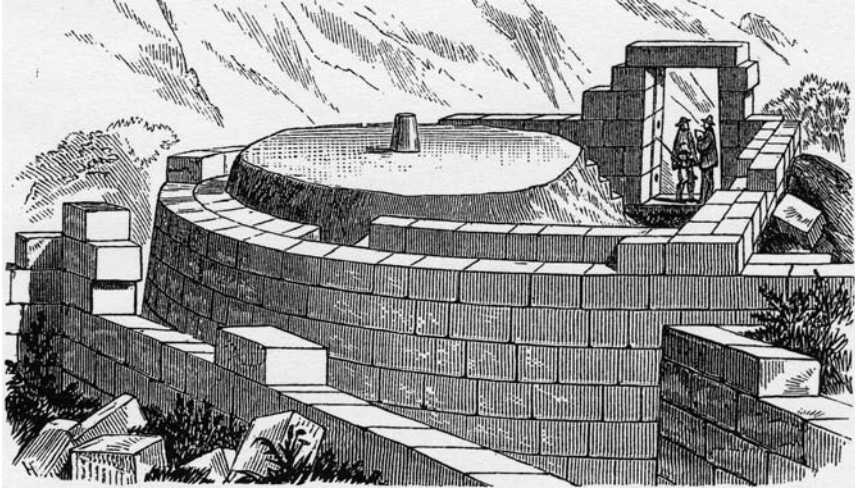
Fallingwater is a great blessing—one of the great blessings to be experienced here on earth. I think nothing yet ever equaled the coordination, sympathetic expression of the great principle of repose where forest and stream and rock and all the elements of structure are combined so quietly that really you listen not to any noise whatsoever although the music of the stream is there. But you listen to Fallingwater the way you listen to the quiet of the country.⁷¹

Visual and auditory uses of water were important at a number of Inca sites as well, especially those on and near the sacred Urubamba River in the Sacred Valley region of Peru. At Machu Picchu, for instance, with its numerous audible fountains and water channels, one also hears the rushing Urubamba River far below.

Though Wright admired the Inca, the responsibility for the use of Pre-Columbian Andean forms at Fallingwater may also lie, at least in part,



Figure 6. Squier, Pisac



Source: Inca, Intihuatana stone and wall, Pisac, Peru, c. 1440–1532 AD. From Ephraim George Squier, *Peru: incidents of travel and exploration in the land of the Incas* (New York: Harper & Bros., 1877), 525.

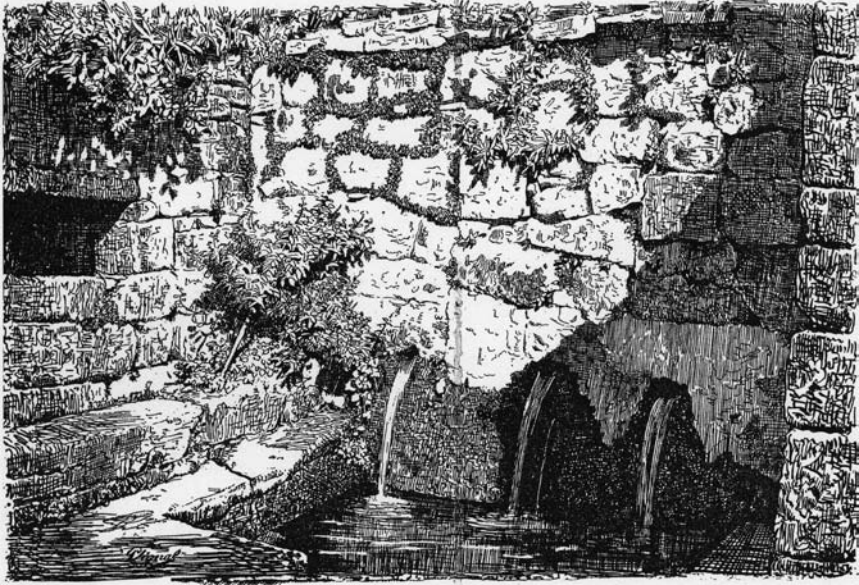
with the Kaufmanns—and, specifically, Edgar J. Kaufmann, Sr., whom Wright biographer Franklin Toker describes as practically a “co-architect” of the house.⁷² Extensive correspondence between Kaufmann and numerous contractors of Fallingwater during construction attest to his high degree of involvement in last-minute building and design touches in and around the house.⁷³

By the time construction began at Fallingwater in 1935, Edgar and Liliane Kaufmann had made several trips to Latin America, including a visit to Panama in 1912, and numerous trips to Mexico between 1912 and 1937. During their travels, the Kaufmanns collected a number of art and artifacts. Today there is a fairly significant collection of Andean (mainly Nasca and Chimú) ceramics on display in the house and guest house, though the collection history of these objects is unclear.⁷⁴ It is possible, if not likely, that client and architect had some discussion about Pre-Columbian art and architecture, though none of the correspondence mentions such a discussion.⁷⁵ At any rate, it is clear that the Kaufmanns embraced both Wright’s vision of an organic modernism as well as Pre-Columbian artifacts, demonstrating their appreciation for both.

Taliesin West and the Andes

That Wright was himself genuinely interested in Pre-Columbian architecture and saw it as a tenable prototype for U.S. styles is supported by the numerous similarities in Wright’s own Taliesin West in Scottsdale,

Figure 7. Wiener fountain



Source: Inca, bath, Copacabana, Bolivia. From Charles Wiener, *Pérou et Bolivie. Récit de voyage suivi d'études archéologiques et ethnographiques et de notes sur l'écriture et les langues des populations indiennes* (Paris: Hachette, 1880), 467.

Arizona, to Pre-Columbian aesthetics.⁷⁶ In their comparisons of features at Taliesin West to Mesoamerican architecture, scholars have identified tiered stairways and the usual flat, heavy mansard roofs that resemble Maya temple forms. Teotihuacan-like (the indigenous culture in the Central Valley of Mexico near what is today Mexico City) massing appears in the talud-tablero (sloping surface or talus topped with platform or tablero) of the main house and in the incorporation of small stones in the façade. Missing from the discussion here is Wright's nod to the Inca, apparent in the distinctive treatment of larger, natural-looking stones, the channeling and pooling of water in and around the house, and the pronounced trapezoidal opening above the shallow wading pool and fountain on the north side of the house (Figure 9).

At Taliesin West, the arid landscape of the American Southwest may have proven an appealing setting for incorporating Pre-Columbian (and Native North American) aesthetics. And the region's cultural history—its Native American and Hispanic presence—may have amplified Wright's existing interest in Pre-Columbian forms. As at Fallingwater, Wright incorporated living stones throughout the buildings and grounds of Taliesin West (Figure 10). At the latter site, however, he manipulated the



Figure 8. Entrance bath Fallingwater



Source: Frank Lloyd Wright, Fallingwater, Mill Run, PA, 1938, fountain near main entrance. (photo by Ruth Anne Phillips; with permission of Western Pennsylvania Conservancy).

placement of rocks more deliberately, working large natural-looking stones into coursed, masonry walls and displaying rocks on pedestals and in prominent locations, such as adjacent to the building's entrances. Boulders incorporated into walls—emphasized by their placement apart from structures or framed by walls and other architectural devices—are also common features of Inca architecture. Such treatment of rocks within Inca building programs was described and illustrated in several of the early publications. Bingham, for example, photographed several examples of natural-looking stones built into Inca masonry walls (**Figure 11**)⁷⁷

Several freestanding or near-freestanding stones are scattered around the Taliesin West grounds. Though resembling typical Inca ways of emphasizing large rocks, several are decorated with Hohokam petroglyphs that depict various combinations of humans, animals, and geometric shapes, also reflecting Wright's interest in the indigenous Southwest. During the design process, Wright had found these decorated rocks throughout the property and moved them into their current locations.⁷⁸ One such

Figure 9. Taliesin West, trapezoidal opening w water and boulder



Source: Frank Lloyd Wright, Taliesin West, Scottsdale, AZ, 1937–59, trapezoidal opening with water and boulder (photo by Michele Poulos; with permission Frank Lloyd Wright Foundation).

Figure 10. Taliesin West, chimney w embedded living rock, main house



Source: Frank Lloyd Wright, Taliesin West, Scottsdale, AZ, 1937–59, chimney with embedded living rock (photo by Michele Poulos; with permission Frank Lloyd Wright Foundation).

Figure 11. Hiram Bingham, Machu Picchu



Source: Inca building, Machu Picchu, Peru, c. 1450 AD.

From Persistent Link: <http://nrs.harvard.edu/urn-3:FHCL:2796270?n=129> Description:

Bingham, Hiram. In the wonderland of Peru :the work accomplished by the Peruvian Expedition of 1912, under the auspices of Yale University and the National Geographic Society / by Hiram Bingham. Washington [D.C. : National Geographic Society, 1913]. III. MAP-WORK OF THE EXPEDITION.x

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Institution: Harvard University

Accessed: 07 June 2013

embellished boulder, for example, rests on a Maya-like stepped, pyramidal pedestal near the main south side entrance, adjacent to the triangular pool. In a courtyard on the northwest side of the house near the theater and sculpture garden is a large cracked stone, decorated with human and animal figures, on a low-lying stepped form near a fountain. Another, with depictions of humans and reptiles on its top, rests in a shallow, blue pool over a fountain. Still another—a tall, oblong undecorated stone—sits on a pedestal near the entrance to the Taliesin West property.

In addition to freestanding boulders placed around the grounds, Wright embedded a number of organic stones in the walls in both the exterior and interior of Taliesin West similar in appearance (though not in technique) to those Inca examples highlighted in the nineteenth and twentieth century literature. Among the most striking of these are the large, rounded stones encased in the chimney walls just above the fireplace of

the main house (see **Figure 10**), as well as the blackened boulder fixed into the concrete wall under the bell tower on the north façade.

Just as at Fallingwater, Wright incorporated both stone and water at Taliesin West. At the site, he created a number of pools and fountains as well as a system of drains that weave in and out of buildings. Wright employed the trapezoid—commonly used for doorways, windows, and niches at Inca sites and unusual elsewhere—for the drains throughout the façade. Ironically, Inca drains themselves tend to be square rather than trapezoidal, so in a sense, Wright was adding a characteristically Inca shape where the Inca themselves did not employ it. A more overt nod to the Inca occurs in the trapezoidal opening that frames the petroglyphed stone, mentioned above, in the blue pool near a fountain on the north side (see **Figure 9**). A similar looking opening, shaped as a trapezoid, at Ollantaytambo was illustrated by Squier, though Wright’s opening and the angles of the walls are wider (see **Figure 1**).

Another element at Taliesin West that is similar to Inca architecture is the use of canted walls that angle outward at the top. This feature of Inca walls was described repeatedly in the early sources on Inca architecture, and is quite apparent in the numerous published photographs and drawings on the subject. Because of the massing, the heaviness of the structures, the emphasis on stone and water, as well as the neutral-colored façade, Taliesin West gives the impression that if it could be stripped of its more modern decorative details—without its splashes of bright reds, rusty reds, whites, blues, golds, and checkered patterns—what would remain would resemble an amalgamation of Pre-Columbian and Native North American ruins.

Conclusion

As the examples at the 1920s L.A. textile concrete block houses, Fallingwater, and Taliesin West have illustrated, Wright’s attraction to and emulation of Inca architecture is indebted both to philosophical and structural concepts—including the employment of mortarless construction and the setting up of intimate relationships between nature and building. Intertwined and ultimately tied to these notions are the more immediately visible resemblances to the Inca in Wright’s oeuvre seen in the integration of natural or “living” stone and water as well as in the use of trapezoidal openings.

At Fallingwater and Taliesin West, Wright’s incorporation of boulders and water within and around the buildings is reminiscent of a number of well-known and highly publicized Inca sites, including Machu Picchu, Pisac, Ollantaytambo, and the Inca capital of Cusco, all located in the Sacred Valley region of Peru’s south central highlands. Additionally, Wright’s 1920s textile concrete block houses in and around Los Angeles, including the John Storer house (Los Angeles, 1923), the Samuel and Harriet Freeman house (Los Angeles, 1924), and the Charles Ennis-Brown house (Los Angeles, 1924), utilize a mortarless, interlocking construction system



that calls to mind Inca walls with finely cut stones that fit together internally, omitting the need for mortar, and offering earthquake resistance.

Hiram Bingham's excavations and publications on Inca architecture, starting in 1911, most notably that at Machu Picchu, ignited excitement about the Inca and served to bring the Inca to the consciousness of a general U.S. public. Wright would have known of the Inca, then, and their earthquake-resistant architecture as he began designing his Mesoamerican-inflected 1920s textile concrete block designs. A major, well-illustrated 1930 article on Machu Picchu by Bingham in *The National Geographic Magazine* followed by his 1938 book, *Lost City of the Incas* coincided with the period that Wright began unprecedented incorporations of living rock and water, literally weaving land with building in ways reminiscent of Inca architecture.

Wright's self-proclaimed interest in Inca and other Non-Western art and architecture, as well as his strong convictions about nature's place in architecture, likely drew him to publications and early exhibits on Pre-Columbian art and architecture. Wright, like others working in the United States in the early decades of the twentieth century, sought the development of a uniquely American aesthetic, removed from European prototypes. The indigenous cultures of the Americas seemed a natural place to turn for inspiration. It is in this context that these architects appreciated "exotic" Non-Western art, of which Inca architecture was a part. The similarities between a number of Wright's designs, including some of his most well-known projects, and Inca and other Non-Western precedents places him within his modernist context, adding to our understanding of the wide-ranging sources that contributed to his own innovative style.

Acknowledgements

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Endnotes

¹ See, for example, Dimitri Tselos, "Exotic Influences in the Architecture of Frank Lloyd Wright," *Magazine of Art: The American Federation of Arts* 46, no. 4 (April 1953), 160–69, 184; Vincent Scully, *Frank Lloyd Wright* (New York: George Braziller, 1960); Gabriel Weisberg, "Frank Lloyd Wright and Pre-Columbian Art—The Background for His Architecture," *Art Quarterly* 30 (1967): 40–51; Dimitri Tselos, "Frank Lloyd Wright and World Architecture," *The Journal of the Society of Architectural Historians*, 28, no. 1 (March 1969), 58–72; Marjorie Ingle, *Mayan Revival Style: Art Deco Mayan Fantasy* (Salt Lake City: Gibbs M. Smith/Peregrine Smith, 1984); David Gebhard, *Romanza: The California Architecture of Frank Lloyd Wright* (San Francisco:

Chronicle Books, 1988); Anthony Alofsin, *Frank Lloyd Wright, The Lost Years, 1910–1922: A Study of Influence* (Chicago: University of Chicago Press, 1993); Barbara Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources of American Art* (New York: Harry N. Abrams, 1993); Robert L. Sweeney, *Wright in Hollywood: Visions of a New Architecture* (New York: Architectural History Foundation, Cambridge: MIT Press, 1994); and Franklin Toker, *Fallingwater Rising: Frank Lloyd Wright, E. J. Kaufmann, and America's Most Extraordinary House* (New York: A.A. Knopf, 2003). Wright's work is most often compared to the architecture of the Maya (flourished c. 100 AD – 900 AD), Zapotec (particularly at the site of Mitla, c. 700 – 1100 AD) and Teotihuacan (c. 1 AD – 700 AD).

²The Pre-Columbian Andean resemblances within Wright's work that are discussed here can be attributed to the Inca. In reality, the situation is a little more complex than this; other Andean cultures, such as Tiwanaku (c. 1–1,000 AD) employed some of the same or similar architectural characteristics as the Inca, such as mortarless masonry and trapezoidal openings. Additionally, in the early days of scholarly studies of the Pre-Columbian Andes, during Wright's time, many more architectural sites were attributed to the Inca than are today.

³Alofsin, 305–306 and 374, n. 63, cited as: "FLW TO CRA [Charles Robert Ashbee], 26 Sept. 1910, quoted in Alan Crawford, 'Ten Letters,' 69. Wright's statement followed in a postscript." See Alan Crawford, *C. R. Ashbee: Architect, Designer and Romantic Socialist* (New Haven: Yale University Press, 1985).

⁴Frank Lloyd Wright, *A Testament* (New York: Bramhall House [Horizon Press], 1957), 204; For scholarly discussion see, especially, Alofsin, *Frank Lloyd Wright, The Lost Years, 1910–1922: A Study of Influence* 305–06. Wright's influences have, of course, been subject to much scholarly attention. In studying the Japanese sources in Wright's work, Kevin Nute observed that the architect "steadfastly maintained that he found in Japanese culture, not the inspiration which many suspected, but merely *confirmation* of many of his own 'organic' ideals." A similar confirmation may be understood in Wright's attitudes toward Pre-Columbian art and architecture. Kevin Nute, *Frank Lloyd Wright and Japan: The Role of Traditional Japanese Art and Architecture in the Work of Frank Lloyd Wright* (London/Glasgow/New York: Chapman & Hall, 1993), 2.

⁵*Ibid.*, 166.

⁶The more accurate term "Neo-Prehispanic" is employed by a number of scholars of Latin American art, including Daniel Schávelzon and Jorge Tomasi, eds. *La Imagen de América: Los dibujos de arqueología Americana de Francisco Mújica Díez de Bonilla* (Buenos Aires: Ediciones Fundación CEPPEA and Fundación para el avance de los estudios mesoamericanos (FAMSI), 2006). Other Latin American scholars who discuss parallel movements that took place in Mexico, Peru, Argentina, and other Latin American countries at roughly the same time also employ the phrase "Neo-Hispanic." For more on this style in the United States, see Ingle, *Mayan Revival Style: Art Deco*



Mayan Fantasy; Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources of American Art*; and Ruth Anne Phillips, "Pre-Columbian Revival': Defining and Exploring a U.S. Architectural Style, 1910–1940" (Ph.D. diss., City University of New York, 2007).

⁷For illustrations of Inca construction techniques, see Graziano Gasparini and Luise Margolies, *Inca Architecture*, trans. Patricia J. Lyon (Bloomington: Indiana University Press, 1980).

⁸For the most comprehensive study of the architecture at Ollantaytambo see Jean-Pierre Protzen, *Inca Architecture and Construction at Ollantaytambo* (New York: Oxford University Press, 1993).

⁹Ephraim George Squier specifically mentions the view at Inca sites. In his description of Ollantaytambo, for example, he notes, "The view from the fortress in every direction is wonderful in variety, in contrast, in beauty, and grandeur." *Peru: Incidents of Travel and Exploration in the Land of the Incas* (New York: Harper & Bros., 1877), 501. For more current discussions on this Inca tendency, see Susan Niles, *The Shape of Inca History: Narrative and Architecture in an Andean Empire* (University of Iowa Press, 1999); and, Carolyn Dean, *A Culture of Stone: Inka Perspectives on Rock* (Duke University Press, 2010).

¹⁰Because Pre-Columbian Andean studies were only beginning in the late nineteenth century, the distinctions among the numerous pre-Hispanic cultures of the region were little understood. An Andean chronology was not established until the first decades of the twentieth century, many works—especially portable objects like ceramics and stone sculpture—were identified as Inca, when, in fact, they belonged to earlier cultures.

¹¹A number of Inca structures, particularly those built during the reign of Pachakuteq Inca Yupanqui, the ninth ruler and first great expansionist and developer of the Inca empire (c. 1430) frame mountains in windows and doorways and feature "mountain stones," or small replicas in stone form of nearby mountains. For more discussion of these aspects of Inca architecture, see Niles, *The Shape of Inca History: Narrative and Architecture in an Andean Empire* and Dean, *A Culture of Stone: Inka Perspectives on Rock*.

¹²Squier, *Peru*, 433.

¹³Wright, *A Testament*, 111 and 205, respectively.

¹⁴*Ibid.*, 111–112; It was common in Wright's time, and even now to a certain extent, to conflate the Pre-Columbian cultures and the names of their more modern geographic regions. "Mexican" art and architecture, for example, often implies Aztec, for example, while "South American" aesthetics can refer to the Inca. Further, there was a general tendency to lump the various Pre-Columbian and Native North American cultures together as if they are one unit. This is why, for example, there are numerous examples in early twentieth century U.S. architecture (and other artforms) of Maya motifs juxtaposed with Teotihuacan or Zapotec forms, for example, while we don't normally see Renaissance forms coupled with those same forms. For more discussion of this tendency, see Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources*

of *Modern Art* (New York: Harry N. Abrams, 1993), 13. Also, Curtis M. Hinsley, "The World as Marketplace: Commodification of the Exotic at the World's Columbian Exposition, Chicago, 1893," in *Exhibiting Cultures: The Poetics and Politics of Museum Display*, eds. Ivan Karp and Steven D. Lavine (Washington, DC/London: Smithsonian Institution Press, 1991), 355.

¹⁵ Holdings at the Frank Lloyd Wright Preservation Trust in Oak Park, Illinois, the Frank Lloyd Wright foundation in Scottsdale, Arizona, and the Getty Research Institute in Los Angeles did not turn up books on the Inca that Wright might have owned. Neither did the library of Louis Sullivan, Wright's employer and mentor in the late nineteenth century, reveal any holdings relevant to Inca architecture. See David S. Andrew, *Louis Sullivan and the Polemics of Modern Architecture: The Present against the Past* (University of Illinois Press, 1985).

¹⁶ The expeditions of Assistant Professor Hiram Bingham of Yale University in the south central highlands of Peru in the early 1910s, through 1920s, which included the excavations of Machu Picchu, garnered significant media attention. See, for example, Hiram Bingham, "A Search for the Last Inca Capital" *Harper's Magazine* 125, no. 749 (Oct. 1912), 695–705; Bingham, "In the Wonderland of Peru" *The National Geographic Magazine* 24, no. 4 (April 1913), 387–573; Bingham, "The Discovery of Machu Picchu," *Harper's Magazine* 126, no. 755 (April 1913), 709–719; "Prof. Hiram Bingham of Yale Makes the Greatest Archaeological Discovery of the Age . . ." *New York Times*, sec. SM, 15 June 1913; Philip Ainsworth Means, "An Ancient City of the Incas: Dr. Bingham Sums Up the Results of the Machu Picchu Expedition," *New York Times*, 4 May 1930; Bingham, *Machu Picchu, A Citadel of the Incas; Report of the Explorations and Excavations Made in 1911, 1912 and 1915 under the Auspices of Yale University and the National Geographic Society* (London: H. Milford and Oxford University Press, 1930).

¹⁷ Bingham, "A Search for the Last Inca Capital," (1912) and "The Discovery of Machu Picchu," (1913) from *Harper's* and "In the Wonderland of Peru,". See also Bingham, *Inca Land: Explorations in the Highlands of Peru* (Boston and New York: Houghton Mifflin and The Riverside Press Cambridge, 1922) EBook # 10772 at <http://www.gutenberg.org/files/10772/10772-h/10772-h.htm>, *Machu Picchu, a Citadel of the Incas: Report of the Explorations and Excavations Made in 1911, 1912 and 1915 under the Auspices of Yale University and the National Geographic Society* (New Haven: Yale University Press for the National Geographic Society, 1930). Bingham created some 12,000 photographs in Peru. See G. M. W., "Hiram Bingham," *Geographical Review* 46, no. 4 (October 1956), 581.

¹⁸ Bingham, "Discovery," 714. In Bingham's 1912 *Harper's* article, Bingham cites Prescott and the French explorer Comte de Sartiges who wrote "Voyage dans les Républiques de l'Amérique du Sud," under the pseudonym M.E de Lavandais, in *Revue de Deux Mondes* (Paris: 1850). Also published in Spanish as *Dos Viajeros Franceses en el Perú Republicano: De Sartiges- Botmiliau*, trans. Emilio Romero (Lima: 1947), as well as a number of Spanish



and Colonial-era authors. In his 1913 Harper's article, Bingham mentions the major works by Squier, *Peru: Incidents of Travel and Exploration*; Charles Wiener, *Pérou et Bolivie. Récit de voyage suivi d'études archéologiques et ethnographiques et de notes sur l'écriture et les langues des populations indiennes* (Paris: Hachette, 1880); and Clements R. Markham, *The Incas of Peru* (London: Smith, Elder and New York: E.P. Dutton), 1910. Additional major works by this author include Markham, *Cuzco: A Journey to the Ancient Capital of Peru* (London: Chapman & Hall, 1856); and Markham, *Peru* (London: S. Low, Marston, Searle & Rivington, 1880).

¹⁹ William H. Prescott, *History of the Conquest of Mexico* (New York: Harper, 1843) and *History of the Conquest of Peru* (New York: Harper, 1847); reprint, *History of the Conquest of Mexico & History of the Conquest of Peru* (New York: Cooper Square, 2000). Prescott's descriptions of the buildings were drawn from the chronicles, the documents by Spanish and other authors, from the period of early Contact through Colonial eras—the sixteenth and seventeenth centuries—that “chronicled” Inca worldviews.

²⁰ Prescott, *History of the Conquest of Mexico & History of the Conquest of Peru*, 780. Prescott cites one of the Spanish chroniclers: Pedro Sarmiento de Gamboa, *Relacion*, MS, capitulo 24, but does not indicate the edition nor other publication details.

²¹ Prescott, *History of the Conquest of Mexico & History of the Conquest of Peru*, 811–14.

²² Prescott, *History of the Conquest of Mexico & History of the Conquest of Peru*, 740–41. Here he cites Pedro Cieza de Leon, *Cronica*, capitulo 93, but does not indicate the edition nor other publication details.

²³ Squier, *Peru: Incidents of Travel and Exploration in the Land of the Incas*.

²⁴ *Ibid.*, 436.

²⁵ *Ibid.*

²⁶ Wiener, *Pérou et Bolivie*. Bingham mentions this book in his article, “The Discovery,” 709–14.

²⁷ Markham, *Incas of Peru*, 32–33, 104, 116, 318–320.

²⁸ http://www.fieldmuseum.org/columbianexpo/highlights_southamerica_1.asp (accessed 18 February 2010).

²⁹ Robert W. Rydell, “Rediscovering the 1893 Chicago World’s Columbian Exposition,” in *Revisiting the White City: American Art at the 1893 World’s Fair* (Washington, DC: Smithsonian Institution, 1993), 38–44.

³⁰ During the latter part of the nineteenth century and early decades of the twentieth century when Pre-Columbian Andes archaeology was in its infancy, misattributions were common with many more objects being attributed as “Inca” than are today; Though records of the exact nature of these exhibits are incomplete, many of the holdings from the 1893 World’s Columbian Exposition were transferred upon closing to the newly built Field Columbian Museum (today the Field Museum of Natural History in Chicago. See the Photo Archives Collections at the Field Museum’s website, <http://fieldmuseum.org/explore/departament/library/photo-archives/collections>).

³¹ Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources of American Art*, 139.

³² According to Anthony Alofsin, Wright attended the 1904 Louisiana Purchase Exposition in St. Louis, Missouri. Alofsin, *Frank Lloyd Wright, The Lost Years, 1910–1922: A Study of Influence*, 12–13. For greater discussion on the anthropology exhibit at the 1904 exposition and its reception by the U.S. public, see Nancy J. Parezo and Don D. Fowler, *Anthropology Goes to the Fair: The 1904 Louisiana Purchase Exposition* (University of Nebraska Press, 2007). Wright discussed his attendance of the 1915 exposition in San Diego in his 1957 autobiography. See Wright, *A Testament*, 111; The National Anthropological Archives of the Smithsonian Institution in Suitland, Maryland, has many photographs of the Pre-Columbian exhibits from the 1904 exposition. See Photo Lot 82–31, plates 1 through 9.

³³ The Andes exhibits were held in the California Building and the Indian Arts Building. See *Official Guide of the Panama California Exposition, San Diego 1915*, esp. pp. 20–23, and 37. Wayne Saunders, curator at the San Diego Museum of Man, confirms that a number of skulls dating to the Pre-Columbian period from South America were on exhibit for the 1915 exposition and are still housed in their collections (e-mail to author, 27 August 2010). San Diego fair organizer Edgar L. Hewett, or a scientist commissioned by him, traveled to Peru and Guatemala, presumably to collect Andean materials. See “Panama-California Exposition, San Diego, 1915–16: Chapter Two: The Exposition Gets Underway,” <http://www.sandiegohistory.org/pancal/sdexpo33.htm> (accessed 6 November 2006).

³⁴ Farnham also designed a frieze illustrating the New World’s struggles for independence at the Main Building of the Pan-American Union headquarters by Albert Kelsey and Paul P. Crét in Washington, D.C. (1910). Hewett spells the artist’s name “Sallie” and refers to her work for the San Diego exposition as a “historical frieze” in a section of his pamphlet entitled, “Works of Art Relating to Ancient America in the California Building” n.p. Marjorie Ingle spells the artist’s first name “Sally” and refers to Farnham’s work in the upstairs boardroom at the Pan-American Union Building as a “mural frieze.” See Ingle, *Mayan Revival Style: Art Deco Mayan Fantasy*, 7. For more discussion on Carlos Vierra’s depictions of Mesoamerican subjects, see Peter D. Harrison, “Carlos Vierra: His Role and Influence on the Maya Image,” in *The Maya Image in the Western World: A Catalog to an Exhibition at the University of New Mexico*, ed. Peter Briggs (Albuquerque: Regents of the University of New Mexico, 1986), 21–32.

³⁵ George H. Sherwood, *General Guide to the Exhibition Halls of the American Museum of Natural History*, Guide Leaflet Series, no. 35, ed. Mary Cynthia Dickerson (New York: American Museum of Natural History, November 1911), inside cover.

³⁶ See Ingle, *Mayan Revival Style*; Gebhard, *Romanza: The California Architecture of Frank Lloyd Wright*; Braun, *Pre-Columbian Art and the Post-Columbian*



World: Ancient American Sources of American Art; and Phillips, "'Pre-Columbian Revival': Defining and Exploring a U.S. Architectural Style, 1910–1940," for further discussion on the origins of the Neo-Prehispanic style.

³⁷ Phillips, "'Pre-Columbian Revival,'" 222.

³⁸ For the role that Abstract Expressionism played in the decreasing popularity of the Mexican vogue in the United States around 1940, see Laurance P. Hurlburt, *The Mexican Muralists in the United States* (Albuquerque: University of New Mexico Press, 1989).

³⁹ The literature on Wright's design philosophies is vast. For the purposes of this study, see esp. Alofsin, *Frank Lloyd Wright, The Lost Years, 1910–1922: A Study of Influence*, introduction and chaps. 5 and 10; and Sweeney, *Wright in Hollywood: Visions of a New Architecture*, chaps. 1–3 and 8.

⁴⁰ Wright's connections to the Arts and Crafts movement are discussed in numerous sources. Examples particularly relevant here include: Alofsin, *Frank Lloyd Wright,, The Lost Years, 1910–1922: A Study of Influence*, 19–24, 92–100, 121, 153, and 306; Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources of American Art*, 297; and, Sweeney, *Wright in Hollywood*, xvii and 240 (fn.9). While many argue for Arts and Crafts connections for Wright, Alofsin successfully highlights the complexities of Wright's relationship to this movement. Some of these seeming similarities to the Arts and Crafts movement overlap with affinities that Donald Hoffmann notes between Wright and Viollet-le-Duc. See Hoffmann, "Frank Lloyd Wright and Viollet-le-Duc," *JSAH* 28, no. 3 (October 1969): 177–83. Both architects, for example, emphasized unity or harmony of design and both stressed the role of the organic in their designs.

⁴¹ Wright, *A Testament*, 202.

⁴² Alfred C. Bossom, *Building to the Skies: The Romance of the Skyscraper* (London: Studio, 1934), 15.

⁴³ Wright, *A Testament*, 64.

⁴⁴ Wright, "In the Cause of Architecture," *Architectural Record* 23, no. 3 (March 1908): 158.

⁴⁵ Wright, *A Testament*, 62.

⁴⁶ Tselos, "Frank Lloyd Wright and World Architecture," 72.

⁴⁷ Wright, "In the Cause of Architecture: VII. The Meaning of Materials—Concrete" *Architectural Record* (August 1928) reprinted in *In the Cause of Architecture*, 205–11. For more on this subject, see Sweeney, *Wright in Hollywood: Visions of a New Architecture*, xvii.

⁴⁸ Wright, "In the Cause of Architecture: III. The Meaning of Materials—Stone" *Architectural Record* (April 1928), reprinted in *In the Cause of Architecture*, 173.

⁴⁹ Wright, "In the Cause of Architecture: III. The Meaning of Materials—Stone" *Architectural Record* (April 1928), reprinted in *In the Cause of Architecture*, 173–74.

⁵⁰ Frank Lloyd Wright, *A Testament*, 111–12.

⁵¹ While there are almost certainly similarities between Inca architecture and that of other cultures Wright admired. In the case of Wright, however, one does not necessarily preclude another. Rather, by Wright's way of thinking, similar approaches to landscape, for example, such as in the terraced hills of Fiesole, Italy, that Wright saw in 1910–11, in Japan which he saw while working on the Imperial Hotel in the late 1910s and early 1920s, and among the Inca, would have only served to strengthen Wright's convictions about the relationships buildings should have to the surrounding landscape. In other words, Wright's connections to the Inca need not diminish the resemblances that exist to other traditions, which fall outside the purview of this article. Here, we focus on the Inca in our aim to include it in ongoing scholarly discourse on Wright.

⁵² Most scholars point to Wright's Albert Dell Cold Storage German Warehouse in Richland Center, Wisconsin (designed 1915), as Wright's earliest U.S. example of Pre-Columbian-inspired architecture, because of its flat roof and geometricized surface treatment that resembles both Maya and Zapotec architecture. The resemblance of the Oak Park studio to Maya precedents, while compelling through visual comparison, is not generally acknowledged, although architectural historian David Gebhard discusses it in his article "The Spanish Colonial Revival in Southern California (1895–1930)," *JSAH* 26, no. 2 (May 1967), 146.

⁵³ Braun, *Pre-Columbian Art and the Post-Columbian World: Ancient American Sources of American Art*, 151–54.

⁵⁴ In Wright's article on concrete for *Architectural Record* in August 1928, entitled, "In the Cause of Architecture: VII. The Meaning of Materials—Concrete," he expresses his opinions on concrete as a building material. He considered it aesthetically lacking in its plain form, but valued its plasticity that allowed it to be formed into various shapes. This is one of numerous articles Wright wrote for *Architectural Record* from 1908 to 1952, anthologized in *In the Cause of Architecture: Wright's Historic Essays for Architectural Record 1908–52* (New York: Architectural Record Books, 1975).

⁵⁵ The National Museum of American History supplied a number of models of Mesoamerican buildings both for the 1915 fair and the 1904 Louisiana Purchase Exposition in St. Louis. The Temple of the Sun from Palenque was on exhibit at both fairs. The National Anthropological Archives of the Smithsonian Institution has many photographs of the Pre-Columbian exhibits from the 1904 exposition. See Photo Lot 82–31, plates 1 through 9, National Anthropological Archives, Smithsonian Institution.

⁵⁶ Several scholars have discussed the context and impetus for Wright's textile concrete-block system, noting that similar construction techniques became popular beginning in the nineteenth century. Wright's design closely resembled others at the time, especially that of Nel-Stone designed by William Nelson who later sought damages against Wright and various building and home owners for patent infringement. For further discussion, see Sweeney, 204–227; also, Jeffrey Chusid, *Saving Wright: The Freeman*



House and the Preservation of Meaning, Materials and Modernity (New York and London: W. W. Norton, 2011), 28–31.

⁵⁷ Frank Lloyd Wright, *An Autobiography*, 5th ed. (New York: Duell, Sloan and Pearce, 1943), 241.

⁵⁸ For greater discussion of the textile concrete block system Wright employed, see Sweeney, *Wright in Hollywood: Visions of a New Architecture*, especially chapters 2 and 3, also 204–227. It should be noted that Wright scholar Bruce Brooks Pfeiffer feels that the incomplete nature of surviving drawings by Wright related to the textile concrete block do not allow a proper determination of how this system worked in practice. See Pfeiffer, *Frank Lloyd Wright, 1917–42*, 90.

⁵⁹ Julius Dietzmann of Iron Craftworks installed metal gates, grilles, and a large fireplace panel, all taken from Maya and Aztec examples, at the Charles Ennis-Brown house. For more discussion of this see Phillips, “Pre-Columbian Revival,” 201–02.

⁶⁰ Wright, *Autobiography*, 214.

⁶¹ *Ibid.*, 215–16. See also Bruce Brooks Pfeiffer, *Frank Lloyd Wright, 1917–42: The Complete Works* (Köln: Taschen), 24; and, Joseph M. Siry, “The Architecture of Earthquake Resistance: Julius Kahn’s Truscon Company and Frank Lloyd Wright’s Imperial Hotel,” *The Journal of the Society of Architectural Historians* 67, no. 1 (March 2008): 78–105.

⁶² Wright, *Autobiography*, 222.

⁶³ Pfeiffer, *Frank Lloyd Wright, 1917–42: The Complete Works*, 26.

⁶⁴ That Wright was equally as concerned with earthquakes in Los Angeles as he was in Tokyo is evidenced in a reference Braun makes to a 1923 essay he wrote, “Experimenting with Human Lives,” in which he articulated “a theory of seismic convulsions in the Pacific rim, mentioning the cities of Los Angeles, San Francisco, and Tokyo (where he had just completed his earthquake-proof Imperial Hotel)” (157). This is an 11-page essay that was published by the Fine Art Society in 1923.

⁶⁵ Wright, *Autobiography*, 246.

⁶⁶ Wright, “In the Cause of Architecture: VII. The Meaning of Materials—Concrete.”

⁶⁷ Wright, *Autobiography*, 246.

⁶⁸ Though Fallingwater is the most famous example of Wright’s incorporation of a waterfall, there are other examples. See Kathryn Smith, “A Beat of the Rhythmic Clock of Nature: Frank Lloyd Wright’s Waterfall Buildings,” in *Fallingwater and Pittsburgh*, ed. Narciso G. Menocal, Wright Studies, vol. 2, (Carbondale: Southern Illinois University, 2000), 1–31.

⁶⁹ Bingham, “In the Wonderland of Peru,” *National Geographic* 24 (April 1913), 12; Reprint, <http://ngm.nationalgeographic.com/print/1913/04/machu-picchu/ingham-text> (accessed 10 April 2011).

⁷⁰ Charles Wiener, *Pérou et Bolivie*, 467.

⁷¹ Wright quoted in Franklin Toker, *Fallingwater Rising: Frank Lloyd Wright, E. J. Kaufmann, and America’s Most Extraordinary House* (New York: Alfred A. Knopf, 2005), 133. Toker does not provide the source of Wright’s statement.

⁷² Toker, *Fallingwater Rising*, 8.

⁷³ Microfiche correspondence, accession number 870496, Frank Lloyd Wright Archives, Getty Research Institute, Special Collections, Los Angeles.

⁷⁴ Toker, *Fallingwater Rising*, 71, 320. Toker notes the sketchy remains of Edgar Kaufmann, Sr.'s personal and business papers, making this assertion difficult to confirm. Still, their trips to Latin America make it plausible that at least some of the ceramics were collected by the senior Kaufmann or his wife. The Pre-Columbian ceramics at Fallingwater include eight from Mesoamerica and six from the Andes: accession numbers 1985.231, 1985.232, 1985.233, 1985.234, 1985.235, 1985.252, 1985.261, 1986.262.1, 1985.262.2, 1985.263, 1985.264, 1985.270, 1985.289 and 1985.290. Cara Armstrong, Curator of Buildings and Collections and Curator of Education, Fallingwater, Western Pennsylvania Conservancy (personal communication with the author, November 2006). Despite the Andean ceramics on display at the house today, the authors found no evidence that the Kaufmanns visited Peru. Dr. Franklin Toker confirms this conclusion, but notes that such a trip also cannot be discounted due to the scant remains of the Kaufmann's personal and business papers (personal communication with the author, April 2007). According to Cara Armstrong, 1985 (the acquisition year of these ceramics) was the year the house was turned over to the Western Pennsylvania Conservancy (personal communication with the author, November 2006). Toker details the difficulties in ascertaining when and from where the objects on display at Fallingwater today were obtained, noting that Edgar J. Kaufmann, Jr. added some works after his parents died. Toker, *Fallingwater Rising*, 320–21.

⁷⁵ A perusal of the archives for the house at the Getty Research Library in Los Angeles did not turn up any mention of Inca architecture but given Wright's attitudes that denied a lack of sources, this is not all that surprising.

⁷⁶ Braun, *Pre-Columbian Art and the Post-Columbian World*, 175–79.

⁷⁷ Bingham, "Wonderland"; See also Squier, *Peru*, 33, 525.

⁷⁸ For further discussion, see Neil Levine, *Architecture of Frank Lloyd Wright* (Princeton University Press, 1996), 255–298.



