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Environmental Integrity:

Interpreting Historic Indoor Conditions

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Environmental Integrity:

Interpreting Historic Indoor Conditions

by

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Abstract

Environmental Integrity:

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Increasing concern with the amount of energy required to maintain static indoor conditions in hot-humid climates is encouraging designers to again contemplate passive methods of indoor environmental control. Yet prevailing cultural perceptions of acceptable comfort levels make building occupants wary of any suggestions to reduce the mechanical control of building interiors. The rapid deployment of air-conditioning in the building sector over the past fifty years and its consequent pervasiveness nearly guarantees that most Americans have had little conscious experience with non-conditioned space.

This thesis considers the potential for historic sites in Texas to interpret pre-air-conditioned indoor environmental conditions and to demonstrate historical approaches to climate mitigation. Within the context of preservation practice and theory, this study examines the historical context for these sites, particularly the professional and cultural constraints on architectural design in the nineteenth-century American South and architects' strategies for managing environmental conditions within the limits of

prevailing stylistic modes. Three case study sites are explored as potential venues for discovery and interpretation of traditional or transitional methods of cooling and ventilation: Historic Texas (Goliad and Comal county) courthouses, Galveston Historical Foundation's Gresham House (Bishop's Palace), and the University of Texas at Austin's Battle Hall. Issues of historical interpretation are discussed and strategies that could be deployed in an indoor-climate interpretive program are proposed.

With the rest of the world poised to follow America's lead into a fully air-conditioned existence, it is critical to understand the modes and methods building designers used in the past in order to imagine alternate futures. Historic buildings and sites are well positioned to be the interpreters of those conditions and activities that made life in a hot-humid climate manageable. However, the ways in which preservationists value and evaluate historic buildings may have to change in order to participate meaningfully in this discussion.

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Chapter 1: The Problem of Environmental Integrity

When preservationist and educator James Marston Fitch in his seminal text *Historic Preservation: Cultural Management of the Built World* advises on the insertion of new mechanical systems into historic buildings, he is adamant that, "*such interventions must by definition be invisible*."[1] Although he regrets the loss of "maximum verisimilitude" that would come with leaving historic buildings un-conditioned, Fitch concludes that at the time he was writing it would be a non-starter. "Most middle-class American tourists travel in the summertime; and just as they would refuse to eat in a non-air-conditioned restaurant or stay at a non-air-conditioned hotel, so would they be reluctant to spend much time in a non-air-conditioned historic house museum."[2] Air-conditioning was inevitable, and the preservationist's job was to make it invisible.

Resignation to this new role for preservation must have been particularly painful for Fitch, for his deep commitment to understanding the "ecological, microclimatic and psychosomatic considerations" that mold architectural form is so clearly evident in his 1972 book, *American Building II: The Environmental Forces That Shape It*, which itself was an extension of ideas posed in an earlier survey text published in 1948.[3] Yet within Fitch's expressions of doubt and resignation lies potential for a revised perspective on mechanical air conditioning's historical trajectory. Rather than seeing it as an always-

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[1] James Marston Fitch, *Historic Preservation: Curatorial Management of the Built World* (University of Virginia Press, 1990), 255. Italics original to Fitch's text.

[2] James Marston Fitch, *Historic Preservation: Curatorial Management of the Built World* (University of Virginia Press, 1990), 256.

[3] James Marston Fitch, *American Building: The Environmental Forces That Shape It* (Boston: Houghton Mifflin, 1972). Quotation is from the second edition, James Marston Fitch, *American Building: The Environmental Forces That Shape It*, 2nd ed. (New York: Schocken Books, 1976), vii. The companion volume to *Environmental Forces* was *American Building I: The Historical Forces That Shape It* (Boston: Houghton Mifflin, 1966). The 1948 edition, which comprised both topics in one volume is *American Building: The Forces That Shape It* (Boston: Houghton Mifflin, 1948).

accepted marker of an ever-progressing technological future, one can also see mechanical conditioning in the context of an ongoing discourse between building technology, designers, building occupants, and the environment, one that is open to change and reassessment.

Fitch would perhaps be pleased to know that in recent years that discourse has shifted toward a questioning of the extent to which we attempt to control indoor environments with building technology. Driven primarily by concerns about rising energy costs and a general acceptance of climate change as human-caused, these qualms are also apparent in recent studies that suggest that isolation from the outdoor environment, as is required by most mechanical cooling and ventilating systems, is detrimental to human health, productivity, and sense of well-being. Writing in the 1980s, when most saw installation of mechanical air conditioning as predestined, Fitch had no choice but to think about the problem of making historic buildings work like newly constructed—and mechanically cooled—buildings. This thesis takes an alternate perspective, viewing historic buildings as valuable because they are decidedly not like new buildings. Rather they are considered as having rich potential for interpreting the less-conditioned culture of the past.

Preservation is already inadvertently working in this direction. The year 2012 marked the 110th anniversary of the first installation of "true" air-conditioning at the Sackett and Wilhelms Lithography Company in Brooklyn, New York, a building that still stands today. Although the first installation in 1902 was not aimed at providing regulated indoor conditions for the building occupants—rather it was aimed at solving an industrial process problem—journalists and citizens alike took the anniversary's opportunity to reflect on how America got "cool." Americans began to ask themselves, "how did we get

here?" and "where will this go?"[4] The rest of the world was slow to pick up our American cooling habits, but in last decade there has been a tremendous rise in air-conditioning installations in industrializing nations. It became clear that understanding the specific history of air-conditioning and its alternate pasts were critical to making decisions about the future.

PRESERVATION'S PAST: MATERIAL OVER INTANGIBLE

Randall Mason has noted that as far back as the nineteenth century the activity of preservation has privileged the material over the intangible.[5] The focus is on artifacts and buildings rather than cultural patterns and practices. Certainly, the non-material indoor environment would not immediately be considered "intangible cultural heritage" as defined by the UNESCO Convention for the Safeguarding of Cultural Heritage, but the seasonal cultural practices developed around non-conditioned spaces and the emotional links to the past available through them could be. Mason argues that the emphasis on material culture in preservation was for the field an act of professional self-preservation, for "scientific methods and objective standards used to treat fabric gave legitimacy. Specialized knowledge about materials and decay gave the new profession an area of activity distinct from that of architects, planners, historians, and others concerned with the built environment."[6]

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[4] Elizabeth Rosenthal, "The Cost of Cool." *New York Times*, 18 Aug. 2012, http://www.nytimes.com/2012/08/19/sunday-review/air-conditioning-is-an-environmental-quandary.html?pagewanted=all; "Should Air-Conditioning Go Global, or Be Rationed Away?" Room for Debate, *New York Times*, 21 Jun 2012, http://www.nytimes.com/roomfordebate/2012/06/21/should-air-conditioning-go-global-or-be-rationed-away

[5] Randall Mason, "Fixing Historic Preservation: A Constructive Critique of 'Significance'" *Places* 16 no. 1 (2004): 64.

[6] Randall Mason, "Fixing Historic Preservation: A Constructive Critique of 'Significance'" *Places* 16 no. 1 (2004): 65.

These scientific tendencies reflect indirectly through the common ways preservationists think about the indoor environment. Namely, the interior environment is something to be controlled with the goal of preserving material artifacts; the focus is preventing decay of furniture collections and building materials. Although preservationists and conservators have come to an understanding in regards to the balance between building and object conservation in historic museums, the artificiality of the indoor climate created to protect the artifacts is often left un-interpreted.[7] At the extreme, one could portray this habit as one that perpetuates a "false" sense of history, namely that building environments were always at a "comfortable" temperature.

Furthermore, by providing specific direction that newly installed air-conditioning systems should be hidden away as much as possible, Park Service guidance, including the Secretary of the Interior's Standards, has inadvertently made the historical transition from non-conditioned to fully conditioned space difficult for a layperson to understand or interpret. Certainly this is not to advocate for conspicuous duct installations (although many have occurred in historic buildings), but the "recommended" approaches that result in a nearly undetectable cooling system have impeded the ability of historic buildings to communicate an element of our shared history, that is the customs, both built and practiced, of adaptation to climate and weather. Without meaning to do so, earnest museum curators, in favoring the material over the immaterial, have obscured an important "force," as Fitch would call it, that has shaped our buildings and culture.

A recent visit to the French Legation Museum in Austin, Texas highlighted this condition. Part of the museum is a small 1841 wood frame building, which has been equipped with central air conditioning. The primary purpose of the environmental

[7] APT/AIC, "New Orleans Charter for Joint Preservation of Historic Structures and Artifacts," http://cool.conservation-us.org/bytopic/ethics/neworlea.html

control system is to protect the small collection of period furniture housed in the building (the presumed secondary purpose is to provide a "comfortable" environment for visitors). While the Legation's choices are typical of most museums, it is nonetheless surprising that neither the interpretive materials nor the docents point out the air-conditioning grilles as an anachronistic element. This is especially remarkable given that they are at great pains to point out every single light fixture or piece of tableware that is not from the museum's chosen period of significance and that the structure itself is one of the few elements in the museum's collection that is actually original to the time and place they are trying to interpret. The museum curators likely assume that interpretation is not necessary because the relationship is obvious to most, but it nonetheless perpetuates a sense that historic buildings operated just as contemporary buildings do and deemphasizes the strategies, building elements, and practices that were historically used to manage the indoor environment.

WHAT INTANGIBLE ARE WE PRESERVING?

Lisa Heschong argues in her book Thermal Delight in Architecture that people have strong emotional and cultural ties to places with distinct thermal qualities, and on one level, preservation of interior thermal conditions provides a link to cultural memories of how a place felt. Heschong focuses on the more extreme uses – the sauna, the public bath – but she proves a point: people like, and even seek out, variation in their thermal experiences, and these experiences often are part of long traditions. Rather than viewing the unusual indoor environments of their buildings as a liability, historic sites could capitalize on their properties' unique conditions. As more and more everyday environments become mechanically controlled, historic sites could provide an especially important experience, time in an "unconditioned" space. At the extreme, of course, are

properties with no mechanical heating or cooling systems. The National Trust's Drayton Hall is the obvious example of this extreme, and it is telling that Drayton Hall promotional materials present the lack of air conditioning as equally shocking as the lack of electric lights or plumbing. At the same time, it is interesting to note that Drayton Hall is an attraction not in spite of its lack of modern systems but because it does not have them.

This thesis investigates sites for potential interpretation from both a historical and contemporary perspective. It first looks historically at the American South in the late nineteenth century, asking how architects in that period thought about the extreme climate of the region and what strategies they used to mitigate it—essentially asking the question: what it is the potential content for interpretation? Although there are long vernacular traditions of climate accommodation, these techniques are not the focus of this thesis, for they are more commonly known and fairly well documented elsewhere. The following chapter considers three case studies from a contemporary perspective. It first documents the buildings' original cooling systems, the current state of those systems, the owners' or operators' efforts to utilize or interpret those systems, and the challenges inherent in those activities and then offers some connections to current research being carried out in preservation and allied fields. The final chapter presents various modes through which historic sites and practices could be understood and interpreted.

Chapter 2: Architects and Climate in the New South, 1880-1915

Historical precedents, namely buildings designed and built prior to the widespread introduction of air conditioning, offer one path toward a less-conditioned future, and growing interest among contemporary architects in passive methods of cooling and ventilation and climate-adapted design has focused attention on these buildings from the past. Certainly these existing structures do not embody the only answer to energy or climate questions—technical advances in environmental controls and new, more efficient equipment have made indoor cooling more efficient and less costly—but architectural interest in these precedents has a longer history than most would assume. Thomas Leslie locates the genesis of this awareness with Sibyl Moholy-Nagy's 1955 manifesto "Environment and Anonymous Architecture," which demanded, as Leslie puts it, "contemporary architectural practice needed to be better integrated with regional, environment-based 'tradition.'"[8]

Although the path toward understanding these precedents will likely be laid by historians rather than architects, historians have sometimes obscured the view of these "traditional" buildings. Standard architectural history surveys identify Reyner Banham's *Architecture of the Well-Tempered Environment* as the classic text of architectural history of the indoor environment. In this book, Banham set out "to consider what architects had taken to be proper use and exploitation of mechanical and environmental controls, and to show how this had manifested itself in the design of the buildings."[9] As part of his ongoing project to deflate Sigfried Giedion's and Nikolaus Pevsner's strident assertions of the Modernist canon, Banham includes in his survey the Royal Victoria Hospital, a

[8] Thomas Leslie, "Environmental Technology, Sustainability," in *Architecture School: Three Centuries of Educating Architects in North America*, ed. Joan Ockman (Cambridge, MA: MIT Press, 2012), 306.
[9] Reyner Banham, *The Architecture of the Well-Tempered Environment*, 2nd ed. (Chicago: University of Chicago Press, 1984), 14-15.

nineteenth century building finished in historical garb (Figure 1). Yet as Banham's intellectual biographer Nigel Whiteley points out, although Banham praises the Royal Victoria Hospital for its innovative mechanical ventilation system, he cannot bring himself to call it a masterpiece, a designation he reserved for Frank Lloyd Wright's Larkin building, built a few years after the Royal Victoria (Figure 2). In Banham's eyes, the Royal Victoria Hospital failed for its historicist styling; its "crust of conventionally conceived architectural forms" essentially negated its success on the technical side.[10] This tendency, writes Whiteley, is a likely a vestige of his time studying under Pevsner; "the environments he writes about have to be well-tempered Modernist ones … because of his own preferences and commitments … polemics and implicit values play as important a part as historical research."[11] Robert Bruegmann, chronicler of early building technologies, took Banham to task for his conclusions about turn-of-the-century architects and buildings, which Bruegmann believed "obscures many of the major goals of 19th century architects."[12] Rather, Bruegmann asserted, many nineteenth century architects "succeeded in integrating aesthetic considerations with a concern for environmental comfort."[13] Disappointing for later historians, this dispute did not evolve into a full reassessment by Banham. He noted Bruegmann's critique in the second edition of Architecture of the Well-Tempered Environment, but left the issue behind in later writing.

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[10] Reyner Banham, *The Architecture of the Well-Tempered Environment*, 2nd ed. (Chicago: University of Chicago Press, 1984), 92.
[11] Nigel Whiteley, *Reyner Banham: Historian of the Immediate Future* (Cambridge, MA and London: MIT Press, 2002), 197, 199.
[12] Robert, Bruegmann, "Central Heating and Forced Ventilation: Origins and Effects on Architectural Design" *Journal of the Society of Architectural Historians* 37 no. 3 (Oct 1978): 154.
[13] Robert, Bruegmann, "Central Heating and Forced Ventilation: Origins and Effects on Architectural Design" *Journal of the Society of Architectural Historians* 37 no. 3 (Oct 1978): 144 note 2.

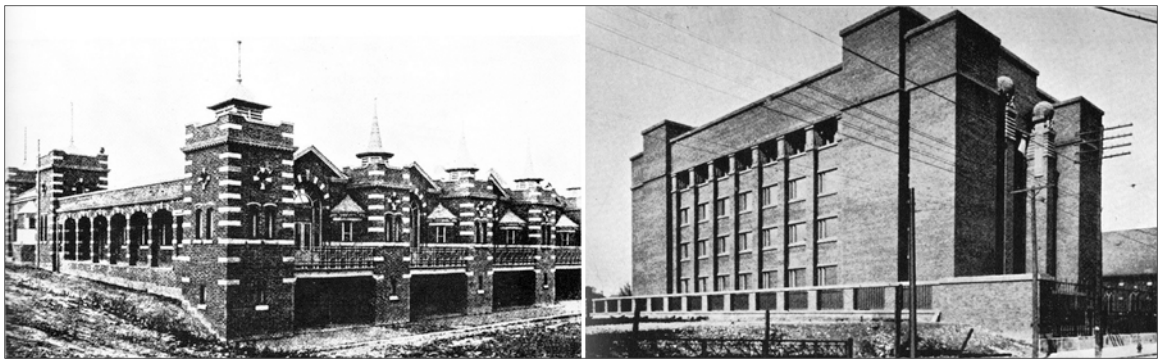

Figure 1. Royal Victoria Hospital, Belfast, Ireland, 1906 (left)

Figure 2. Larkin Building, Buffalo, New York, 1906 (right)

This chapter thus proposes a reframed view of late-nineteenth-century architects' efforts at providing environmental comfort through their buildings. Although Banham ultimately could not reconcile the "total irrelevance of detailed architectural 'style' to the modernity of the functional and environmental parts," turn-of-the-century architects in fact developed clever design solutions to mediate climate conditions within traditional stylistic norms. In recognizing the specific historical context for stylistic conformity in this time period, it is possible to more deeply understand the precedents and the design solutions produced at this time.

This research is also an effort to recognize the work of these nineteenth-century professional architects as consciously aware of their responsibility for the indoor environment. Both architects and historians have devoted significant attention to "vernacular" manifestations of climate-adapted building, but they give far less attention to professionally conceived work. While there are clearly lessons to be taken from vernacular design, a perspective focused only on the vernacular tends to obscure the possibility that architects in the past could be sensitive to climate and design accordingly.

It is possible that this perspective comes from being burned too many times by modern architects' unfulfilled claims to solve the environmental problem. For instance, in 1929 Le Corbusier proclaimed, "Every country builds its houses in response to climate. At this moment of general diffusion, of international scientific techniques, I propose only one house for all countries, the house of 'exact breathing.'"[14] Although it had a romantic ring, the house of "exact breathing" did not live up to its promise. The poor environmental comfort performance of Le Corbusier's 1933 Salvation Army building in Paris, called into doubt the ability for modernists to moderate comfort through design.[15]

A METHODOLOGY FOR AN ENVIRONMENTAL HISTORY OF ARCHITECTURE

The path to historical understanding of architectural response to the environment should be tread carefully. Just as today, not all buildings from the past performed to their highest potential. Limitations of budget, location, program, or client can significantly influence an architect's ability to carry out a thoughtful design. An unquestioning assumption that all buildings from the past were designed completely in tune with the climate will surely lead to disappointment. There are certainly things to be learned from these buildings, but they must be viewed in an informed way. A clear understanding of historical context—the limitations and values in place at the time these buildings were built—has the potential to uncover truly innovative practices through an articulation of those that were compromised.

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[14] Le Corbusier, Precisions: On the Present State of Architecture and City Planning (Crés, Paris, 1930; English translation, MIT Press, Cambridge, MA, 1991), quoted in Dean Hawkes, *Architecture and Climate: An Environmental History of British Architecture, 1600-2000* (London and New York: Routledge, 2012), 7.
[15] Thomas Leslie, "Environmental Technology, Sustainability," in *Architecture School: Three Centuries of Educating Architects in North America*, ed. Joan Ockman (Cambridge, MA: MIT Press, 2012), 306.

The tracing of the environmental history of architectural practice is of course complicated by the fact that people are adaptable, both physically and socially. While human physiology is clearly responsive to differences in temperature and humidity, social customs and ideologies influence how those environmental conditions are interpreted and by extension what humans may demand from their built environment. As John Crowley puts it in his historical study of comfort, "people can usually get used to anything, and most people think that the way they live is the right way to live."[16] As such, the desire for a particular level of thermal comfort may come from a number of sources: a client's personal beliefs, which may have been influenced by popular literature; an architect's beliefs, which may have been influenced by a particular educational or professional training; or today a regulatory agency's beliefs, which may have been influenced by any of the above or by manufacturers' claims.

The task of the historian is to parse these various influences. For their work on climate and culture in historical design, Anat Geva and David Dubblelde have developed a methodological construct that attempts to isolate various factors of influence on built form, with the aim of understanding the weight or significance attached to each of these factors. The influential factors Geva and Dubblelde identify are: culture, building technology, environment (both physical and built), and faith (they are working with religious structures), but one might replace "faith" with "program" in considering non-religious structures. Although the authors of the methodology are fully cognizant of its artificiality and admit that there is more overlap and nuance than the factor boundaries

[16] John E. Crowley, *The Invention of Comfort: Modern Sensibility and Design in Early Modern Britain and Early America* (Baltimore and London: Johns Hopkins University Press (2001), 290.

imply, the methodological approach has nonetheless been useful in structuring thinking in this chapter.[17]

Accounting for Time and Place

Although Willis Carrier's air-conditioning company was founded in Buffalo, New York, cultural perceptions locate the profound effects of air conditioning in the American South. It is common to hear declarations that "Houston is the city that air conditioning built" and claims that no human beings would or could live in Atlanta were in not for the summer respite of the air-conditioned home, car, office, theater, or store. Yet Americans did live in the southern states prior to the advent of mechanical cooling, and many of the buildings constructed at this time still exist, and although many of these same buildings have been retrofitted with air-conditioning systems, the strategies and forms deployed by earlier architects have potential to inform design practice today. But so omnipresent is the habit of indoor cooling that the work of uncovering these strategies is sometimes more archaeology than history.

The archaeological layers are further complicated by the historiography of the southern past. As Catherine Bisher, architectural historian and North Carolina native put it, the version of southern history she grew up with (presumably in the 1950s) "skipped an entire chapter of the late nineteenth century," and built revisionist monuments and memorials to facilitate the blind spot.[18] Nonetheless, the period between 1880 and 1915,

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[17] Anat Geva, "The Interaction of Climate, Culture, and Building Type on Built Form: A Computer Simulation Study of Energy Performance of Historic Buildings" (PhD diss., Texas A&M University, 1995); David Dubbelde, "Influence of Culture, Faith, Environment, and Building Technology on the Built Form: The Case of Nineteenth Century Catholic Churches In Galveston, Texas" (PhD diss., Texas A&M University, 2006).

[18] Catherine W. Bisher, *Southern Built: American Architecture, Regional Practice* (Charlottesville: University of Virginia Press, 2006), 4.

when the South was making a conscious effort at industrialization, remains an intriguing time period for its transitional status between "un-cooled" and "cooled."

IS THERE A SOUTHERN ARCHITECTURE?

To a certain extent, the basis for an environmental history of the American South is a question of whether there is a "Southern Architecture," and by extension whether regional architecture can be defined by climate. Many scholars point to the vernacular architectural forms of the South that are adapted to the hot-humid climate: the dogtrot cabin, the single and double pen plans as evidence that southern architecture has a distinctive form.[19] This may be partly true, but the issue becomes more complicated when moving into the latter part of the nineteenth century, when the South was beginning to urbanize and architects in the South were building much more than genteel residential buildings.

A survey of the professional journal *Southern Architect* suggests that there were hints of a desire, if not a frequently discussed one, to create such an architecture that was adapted to the southern climate.[20] In the reprinting of the proceedings of the Second Annual Convention of the Southern Chapter of American Institute of Architects in 1893, the opening speaker proclaims, "As a body we have a great work to accomplish in the

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[19] Paula Mohr, "Architecture," in *The South*, part of the Greenwood Encyclopedia of American Regional Cultures, eds. Rebecca Mark and Rob Vaughn, (Westport, CT and London: Greenwood Press, 2004), 2

[20] *The Southern Architect* (later renamed *Southern Architect and Building News*) was published in Atlanta Georgia from 1889 to 1932. Few copies of early issues of the journal exist, and the University of Texas at Austin has the largest collection of extant copies. Although a nationwide search was conducted to find additional issues, only the years 1892-1893, 1904-1905, and 1914-1915 were available through the University of Texas and its interlibrary loan program. Issues from 1892-1893 and 1914-1915 are available at the University of Texas at Austin Architecture and Planning Library special collections. Issues from 1904-1905 are available on microfilm from the Center for Research Libraries, Chicago, IL. The *Southern Architect* ran as a monthly publication in 1892-1893 and 1914-1915 and had similar content and format in both periods. In 1904-1905, the journal ran as a weekly publication, and the content was somewhat different that the other years reviewed. During the years as a weekly publication, the journal contained less substantial content, dedicating almost the entire issue to contract award listings.

development of southern architecture. *Our climate demands entirely different planning* and there is a large scope of country to be worked" (emphasis added).[21] At the same meeting M.J. Dimmock even advocated looking to the existing climate adapted building stock, "There were public buildings and many planters' houses which were admirable in design and were planned to suit the wants and requirements of the day and climate, and some of those are to-day worthy of study."[22] In 1913, Lyndon P. Smith, an architect with a practice split between New York and Atlanta, spoke out in support of a distinctly southern architecture, "not based on fake and foible, but indigenous, truthful and natural esthetically and constructively," noting that "climate should be the most important factor in giving style to the architecture."[23]

But the reality is that even if architects intended to respond to the climate, on the whole that is not readily evident in their buildings' elevations or plans in this time period. Pictorial and written surveys of southern architecture reveal built works that look like those found elsewhere in America, even those in the cold Mid-west and Northeast.[24] An architectural critic sent by the journal Architectural Record in 1911 to survey the potentially exciting state of the profession in the South observed, "Even the special physical requirements of the southern climate, the greater need for shade, does not pervade the domestic architecture. As a rule, the good houses in the South might as well be in New England."[25] The skyscrapers that the critic noted also looked just like those in

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[21] *The Southern Architect*, 4 no 4 (Feb 1893): 93.
[22] *The Southern Architect*, 4 no 4 (Feb 1893): 98.
[23] Lyndon P. Smith, "A Word on Architecture," *Southern Architect and Building News* 30 no. 3 (December 1913): 37.
[24] American Institute of Architects, *Southern Architecture Illustrated* (Atlanta: Harman Publishing Co, 1931); Wayne Andrews, *Pride of the South: A Social History of Southern Architecture* (New York: Athenaeum, 1979).
[25] Russel F. Whitehead, "The Old and the New South: A Consideration of Architecture in the Southern States," *Architectural Record* 30 no. 1 (Jul 1911): 44.

Chicago. In the context of scholarship, most writers do not dispute this.[26] Lewis Mumford, asked in 1941 to speak at a southern university on the theme of southern architecture at first dodges the issue by discussing H.H. Richardson, a native-born southerner, but not one who worked in the South. But he admits later, "the truth is that although there were many empirical improvements in American architecture to adapt it more closely to its environment, the conscious effort to make full use of regional resources and regional opportunities, in the design itself, goes back no farther than the eighteen-eighties," and in this case he seems to be specifically referencing the work of Frank Lloyd Wright.[27]

Given these circumstances of the built environment, it is no surprise that southerners adopted air conditioning so quickly when it became available; their buildings were almost unanimously considered ill-adapted. Yet one cannot blame only the South's architects for this state of affairs. As the cases noted above demonstrate and as our intrepid 1911 Architectural Record critic traveling to the South observed, "to understand the architectural development of any region it is necessary to be familiar with the history of the people, their religion, their commerce, their society. Realizing that all works of architecture must be social institutions…"[28] In the context of the American South, architects were significantly limited in their ability to address the harsh climate of the region. Although there are several mitigating factors governing this situation, this essay will focus primarily on the economic and the professional.

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[26] Paula Mohr, "Architecture," in *The South, part of the Greenwood Encyclopedia of American Regional Cultures*, eds. Rebecca Mark and Rob Vaughn (Westport, CT and London: Greenwood Press, 2004), 2.
[27] Lewis Mumford, *The South in Architecture* (1941; reprint New York: Da Capo Press, 1967).
[28] Russel F. Whitehead, "The Old and the New South: A Consideration of Architecture in the Southern States," *Architectural Record* 30 no. 1 (Jul 1911): 1.

ARCHITECTURE IN THE "NEW SOUTH"

Foregoing a certain amount of nuance, historians label this time period (1880-1915) as the "New South," following from a term coined in the 1880s by Henry W. Grady, then editor of the Atlanta Constitution.[29] In Grady's words, "The New South…is enamored of her new work…We have learned that one Northern immigrant is worth fifty foreigners, and have smoothed the path southward." [30] The message, in the wake of Reconstruction and the economic devastation of the Civil War, was a rallying cry to leave behind the South's agrarian past and look toward an industrialized and prosperous future, especially one that looked like the neighbors to the north. The term is problematic, of course. Not only was its author deeply racist and xenophobic, but also, as C. Vann Woodward points out, the term "New South" is a cliché that stands in somewhat awkwardly for a more finely graded history.[31]

The journal *Southern Architect*, which was for a time in the 1890s the official organ of the newly formed southern chapter of the American Institute of Architects, shared the optimistic view of the New South promoters. Although he was making a plea for financial and subscription support at the time, the journal's editor proclaimed in the September 1892 issue that the architectural profession "has a large and important field before it in our progressive South."[32] It was a position he reiterated again more boldly just a few months later, "We can now confidently expect a long period of peace and prosperity for our country. Political excitements, which have irritated the people and

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[29] C. Vann Woodward, *Origins of the New South, 1877-1913* (Baton Rouge: Louisiana State University Press, 1980); Paula Mohr, "Architecture," in *The South, part of the Greenwood Encyclopedia of American Regional Cultures*, eds. Rebecca Mark and Rob Vaughn (Westport, CT and London: Greenwood Press, 2004), 18.

[30] Henry W. Grady quoted in Wayne Andrews, *Pride of the South: A Social History of Southern Architecture* (New York: Athenaeum, 1979), 149.

[31] C. Vann Woodward, *Origins of the New South, 1877-1913* (Baton Rouge: Louisiana State Univ Press, 1980), ix.

[32] *The Southern Architect*, 3 no 11 (Sep 1892): 263.

interfered with the steady progress of commercial, industrial and speculative enterprises … The South will experience an unprecedented run of prosperity."[33]

Although in a coded way, *Southern Architect* was also appealing to the socially progressive and abolitionist spirit of the north. The editor, Charles W. Hubner, somewhat surprisingly a former Confederate officer, compared the new bright future of the South to the dark days of the past in editorials with deceptively simple titles such as "Then and Now":

> All of the walls, and barriers, and partitions, have crumbled into dust long ago—they belong to the curious relics of the past…Today a different and far nobler spirit prevails. Men do not live in artificially separate worlds; one full of cheerful warmth, sunshine and beauty; the other cheerless, cold and dark; a world of lawless force and irresponsible despotism, and a world of slavery, poverty, degradation and suffering; the one for the privileged few, the other for the oppressed and unprivileged many. These are some of the factors that constitute the wonderful difference between Now and Then![34]

As Dell Upton has noted, social progressivism was not uncommon in architectural publications of the antebellum era, but it seems especially significant in the era following the Civil War.[35] Nonetheless, although it was purportedly aimed at builders in addition to architects, the Southern Architect was predictably conservative when it came to labor issues. As one editorial note put it, "how silly the expression of a speaker at a recent labor convention, who…said that he wanted to see 'labor disenthralled from capital.' Besides being a demagogue, the man was a fool. Labor and Capital cannot be separated. They must live and die together."[36]

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[33] *The Southern Architect*, 4 no 2 (Dec 1892): 35.
[34] *The Southern Architect*, 3 no 11 (Sep 1892): 265.
[35] Dell Upton, "Pattern Books and Professionalism: Aspects of the Transformation of Domestic Architecture in America, 1800-1860," *Winterthur Portfolio*, 19 no. 2/3 (1984): 127.
[36] *The Southern Architect*, 3 no 11 (Sep 1892): 263.

With the above caveats, it is thus possible to interpret the architecture of the "New South" as an exercise in conformity and an appeal to potential northern clients, both ones who would build and ones that may build industries in the South. In order to tempt northerners to move to—and more importantly to invest in—the southern states, it was likely considered critical that the South look like the North. In the spirit of a reunited nation, the emphasis was on an American architecture more than a Southern one, "Why should we be content to imitate other nations, other people and other times in our styles or architecture? Can we not have a style that will picture in every feature the genius and resources of America, the greatest of all nations on earth?"[37] The primary object is to promote a united front; any matters that could differentiate the South from the North, such as innovative architectural responses to the hot climate, must be subsumed.

A PROFESSIONAL FRONT

The second, and perhaps more powerful, force driving the architects' activity in the American South around the turn of the twentieth century was professionalization. As Dell Upton articulates in his study of early architectural handbooks, architects in early nineteenth century America "were explicitly attempting to define architectural design as an endeavor distinct from, and superior to, building construction."[38] Among the strategies the architects used for create this hierarchical delineation was the establishment of ethical standards and codes of conduct, which created—in theory at least—the appearance of cohesiveness and a uniform set of expectations that clients could rely upon when interacting with clients.[39] While simultaneously denigrating the common builder and

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[37] *The Southern Architect*, 3 no 11 (Sep 1892): 264.
[38] Dell Upton, "Pattern Books and Professionalism: Aspects of the Transformation of Domestic Architecture in America, 1800-1860," *Winterthur Portfolio*, 19 no. 2/3 (1984): 110.
[39] Dell Upton, "Pattern Books and Professionalism: Aspects of the Transformation of Domestic Architecture in America, 1800-1860," *Winterthur Portfolio*, 19 no. 2/3 (1984): 112.

stoking "middle and upper classes' fear that they would be victimized by builders," the architects presented their profession as the mediator and protector of the client against the "self-seeking" builder.[40] The relationship with the client would be one based on mutual "good taste," a characteristic that had to be cultivated and constantly tended as taste embodied the "notion of constant change fueled by fashion and by progress: one had to keep up with the times in order to enjoy the best that American society had to offer."[41] Mary Woods noted similar strategies in her survey of professional architectural journals of the second half of the nineteenth century. The editorial message was a call for professional unity and a hope for "primacy in conceiving and guiding design and construction; the client, builder, and mechanic were to defer to [the architect's] professional expertise." These goals would be achieved only through the establishment of educational standards, the initiation of a percentage fee structure, and policing of fellow professionals who may be tempted to accept bribes.[42]

The same strategies were borne out in the establishment of the Southern Chapter of the American Institute of Architects. The opening remarks at Chapter's first annual convention give a clear sense of the motivations for the association:

> This Chapter was organized for the purposes of uniting in Fellowship, the worthy, active architects of the Southern States; for…the stimulation of each Fellow to a higher degree of proficiency and usefulness, thereby elevating the profession to a high position…the benefits arising from a frequent exchange of views regarding questions of expediency and methods…in dealing with perplexing problems…so we are better understood by the public…But we are not to find the cure for our ills in revolutionary measures or Trades Union measures, but by appealing in an

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[40] Dell Upton, "Pattern Books and Professionalism: Aspects of the Transformation of Domestic Architecture in America, 1800-1860," *Winterthur Portfolio*, 19 no. 2/3 (1984): 119.
[41] Dell Upton, "Pattern Books and Professionalism: Aspects of the Transformation of Domestic Architecture in America, 1800-1860," *Winterthur Portfolio*, 19 no. 2/3 (1984): 124.
[42] Mary Woods, "The First American Architectural Journals: The Profession's Voice," *Journal of the Society of Architectural Historians* 48 no. 2 (Jun 1989): 117.

intelligent manner to the intelligence of the public, with an equitable and clear-cut Code of Professional Ethics.[43]

Enmity for builders played out in remarks made at the Chapter's second annual convention in 1893. The speech entitled "The Practice of Builders Making and Furnishing So-Called 'Architectural Drawings'" outlines the concerns of competition, especially for "those who are located and practicing in the smaller cities and towns where the evil is greatest."[44]

The minutes from early meetings of the Texas State Association of Architects in January 1888 are even more explicit about their goals in forming the group. The president of the Association entreated the members to "set aside prejudice and selfishness…[if we] wish to become a society that is worthy of and command the respect of the community and the confidence of our clients," and more specifically "don't backbite or slur fellow architects, even those who used to be 'Mechanics' and not in our eyes a professional architect because he has not passed through the full professional course…don't enter competitions and don't do public work because it has a tendency to demoralize."[45] The primary goal of the Association for that year was to legally delineate the boundaries of the profession by proposing a bill in the state legislature that would regulate architectural practice.

Nicholas Clayton and James Riely Gordon, early Texas architects whose individual works are analyzed later in this chapter, were both members of these organizations and clearly concerned with establishing their status as professionals. Although Clayton was not formally trained at a university, he nonetheless advertised as

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[43] "To the Architects of the Southern States," *The Southern Architect*, 3 no 12 (Oct 1892).

[44] M.J. Dimmock of Richmond, VA, on "The Practice of Builders Making and Furnishing So-Called 'Architectural Drawings.'" read by W.E. Hall of Winston, NC, *The Southern Architect*, 4 no 4 (Feb 1893): 98.

[45] James Riely Gordon (1863-1937) Drawings and Papers, c1890-1937, the Alexander Architectural Archive, the General Libraries, the University of Texas at Austin.

the first professional architect in Texas. Gordon promoted the benefits of working with an architectural professional in a statement written to potential clients, members of a public commission to select an architect for a new courthouse, "Not being architects yourselves, we assume that you are seeking the most capable professional service to protect the interest of your constituents, as you would seek the best legal, medical or other service to protect your individual interests."[46]

Similar to the effort to project a new South united in purpose with the industrialized North, the newly professionalizing architects of the southern states for reasons of professional survival were driven more by conformity than from individuation and distinction. Expressed architectural solutions to the hot climate would undermine the greater purpose of establishing the architectural profession as predictable and uniform.

UNDERSTATED COOL

In light of the stated intent of the Southern Chapter of the AIA to provide a forum for "frequent exchange of views regarding questions of expediency and methods…in dealing with perplexing problems" one would assume that the extreme heat of the South would be a primary topic of discussion in the Southern Architect.[47] However, out of numerous other articles, only one short article describes the challenge of the heat of the south and offers specific climate mitigation advice:

> An architect, to understand the requirements, must live on the spot. Eight months out of twelve southern life is, essentially, an outdoor existence, and narrow halls, doors to rooms, except bedrooms of course, and cramped and poky staircases are an abomination. The great deliverance is air and plenty of it…During the heat of the day when the sun is southerly, it is almost perpendicularly over one's head and the piazzas are not imperative, though, of course, it is a comfort to have them.

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[46] James Riely Gordon (1863-1937) Drawings and Papers, c1890-1937, the Alexander Architectural Archive, the General Libraries, the University of Texas at Austin.
[47] To the Architects of the Southern States," *The Southern Architect*, 3 no 12 (Oct 1892).

> But the westerly or afternoon sun is the most oppressive, and a low wide veranda, not less than nine feet, is almost a necessity of existence with comfort.[48]

Yet despite the lack of public exchange, architects in the American South were actively attempting to mitigate the harsh climatic conditions. A close investigation of key architects' designed works and professional correspondence revealed climate-adaptive strategies cleverly woven into buildings that were otherwise detailed in the prevailing stylistic modes. Although the architects proposed many approaches to the heat problem, many strategies emerge as ways to catch or drive cooling "breezes" through their buildings.

The Architects

Born in 1840 in Ireland, Nicholas J. Clayton was brought by his recently widowed mother to the United States in 1848. The small family settled in Cincinnati, Ohio, where Clayton's architectural biographers believe he may have apprenticed, or at least observed closely, his uncle's work in various building trades.[49] After serving on the side of the Union during the Civil War, Clayton worked as a stone cutter in Cincinnati and eventually moved to Memphis, Tennessee, where he began working for the architectural firm Jones & Baldwin. That firm in 1872 sent Clayton to supervise a large construction project in Galveston, Texas, where Clayton stayed on in 1874 to open an architectural practice. Between 1877 and 1881, Clayton worked in a partnership with civil engineer, Michael Lynch. Although he is most well-known for his religious buildings, Clayton's firm produced designs for a variety of building types, including large residences, institutional and commercial buildings. Architectural historian Stephen Fox describes Clayton's body of work as "consistently informed by a High Victorian sensibility…richly

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[48] "Southern Houses" *The Southern Architect*, 4 no 12 (Oct 1893): 350.

[49] Barrie Scardino and Drexel Turner, *Clayton's Galveston: The Architecture of Nicholas J. Clayton and His Contemporaries* (College Station: Texas A&M University Press, 2000): 29.

plastic manipulation of building surfaces, deployed in aggressively mannered renditions of the Gothic revival, the pre-Richardsonian Romanesque, and neo-Grec classicism."[50] Clayton worked primarily in Galveston, but received some commissions in other Texas cities as well as Florida, Kentucky, Georgia, and other southern states. Surveys of Texas and Galveston architecture from this period celebrate Clayton's work for its astute composition in romantic styles but Clayton also promoted himself as expert with new building systems. In Galveston City Directory advertisements from the 1880s and 1890s, Clayton publicized his firm's "special attention given to modern designs embodying the latest conveniences, sanitary appliances, heating and ventilation."[51] Clayton's practice in Galveston declined in the twentieth century and ended with his passing in 1916.

Younger than Clayton, James Riely Gordon was born in 1863 in Winchester, Virginia, but his family moved to San Antonio, Texas, in the early 1870s. After completing secondary school in 1878, Gordon went to work for the International-Great Northern Railroad in the engineering corps, but he left it in 1881 to work in the office of San Antonio architect William K. Dobson, whom Gordon credited for his most meaningful architectural training.[52] Work as a draftsman in other firms eventually led Gordon in 1884 to open his own practice, which specialized in public buildings. Gordon's name is virtually synonymous with the late-nineteenth-century Texas county courthouse building campaign, in which Gordon designed over fifteen major buildings between 1890 and 1904. Stephen Fox refers to Gordon as the "wunderkind" of nineteenth-century Texas architecture and considers him a master of the Richardsonian

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[50] Stephen Fox, "Texan 7," *Architectural Review* (Nov 1978): 275.
[51] Galveston City Directory, (1889-1890): 33.
[52] Chris Meister, *James Riely Gordon: His Courthouses and Other Public Architecture* (Lubbock: Texas Tech University Press, 2011).

Romanesque.[53] In 1904 Gordon moved his practice to New York City, where he continued work until his death in 1937.

The Strategies

Of the two architects, Gordon was the only one to explicitly address the design challenge of the climate, "It is not difficult in the South to keep comfortably warm during the winter, but it is a monster problem to keep cool during the long hot summer."[54] Even so, his solutions were not necessarily detectable by visitors to the buildings. Both architects dealt with this "monster" subtly and within the "crust" of the accepted stylistic conventions. Nonetheless, this investigation revealed three strategies of climate adaptation mobilized by the architects that still fit within the cultural and professional constraints. While these identified strategies by no means represent a conclusive picture of all methods employed by architects and designers in the late nineteenth century, they do offer clues for further research.

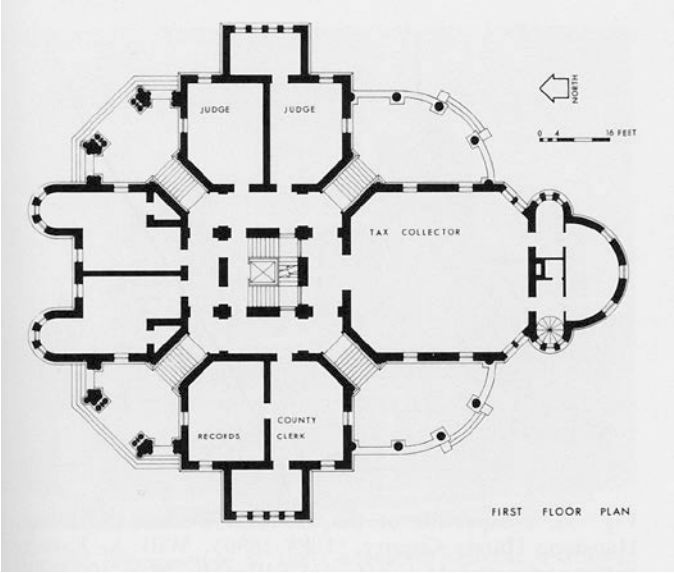

Figure 3. J. Riely Gordon's "Signature Plan"

Although southern architects' facades may have looked nearly identical to designs produced for northern climates, the orientations, plans, sections of the southern architects' buildings were often configured specifically to

[53] Stephen Fox, "Texan 7," *Architectural Review* (Nov 1978): 276.
[54] James Riely Gordon (1863-1937) Drawings and Papers, c1890-1937, the Alexander Architectural Archive, the General Libraries, the University of Texas at Austin, Folder GOR 8-12.

address the southern climate, primarily through increased ventilation and air circulation. James Riely Gordon, as the young superintendant of construction for the new federal building in San Antonio in 1887, made a bold move to suggest to the building's designer, the Supervising Architect of the Treasury, that the building be reconfigured in plan and orientation to avoid becoming like the 1878 Austin federal building, which was a "notorious 'hot box' for want of ventilation."[55] Yet while the plans for the building were completely redrawn by Gordon, the "styling was unchanged from the original design."[56] In his later design work, especially that for the series of Texas county courthouses, Gordon developed further the capacity of a building's plan and section to mitigate the hot weather, efforts which evolved into his "Signature Plan" for courthouses (Figure 3). Although the "Signature Plan" addressed numerous other issues such as acoustics, circulation, and civic presence, Gordon cites the Plan's adaptation to the climate as its primary innovation.[57] In discussions with his potential clients, Gordon promoted the features and functions of the plan, such as the stone galleries onto which each first floor office opened that provided comfort to the building's occupants, and described in detail the purpose of the cruciform plan, open central shaft, and domed section:

> if the building were square, and the breeze struck one corner, it would simply divide and allow it to go both ways by the building and not be utilized. The breeze that strikes between these angles is upon the principle of entering a funnel, it draws it through the entire structure by the means of the dome and it is therefore not wasted…The dome opens on four sides above the roof, and acts upon the same principle as a fire place with a good draft…during periods when there is no breeze, by opening the outside windows and transoms, and opening the dome windows as much or as little circulation of air can be cr[e]ated as is desired…This

[55] Chris Meister, *James Riely Gordon: His Courthouses and Other Public Architecture* (Lubbock: Texas Tech University Press, 2011), 18.
[56] Chris Meister, *James Riely Gordon: His Courthouses and Other Public Architecture* (Lubbock: Texas Tech University Press, 2011), 20.
[57] Chris Meister, *James Riely Gordon: His Courthouses and Other Public Architecture* (Lubbock: Texas Tech University Press, 2011), 290.

is not an experiment as the many letters from those who have occupied the completed buildings embodying this system will testify.[58]

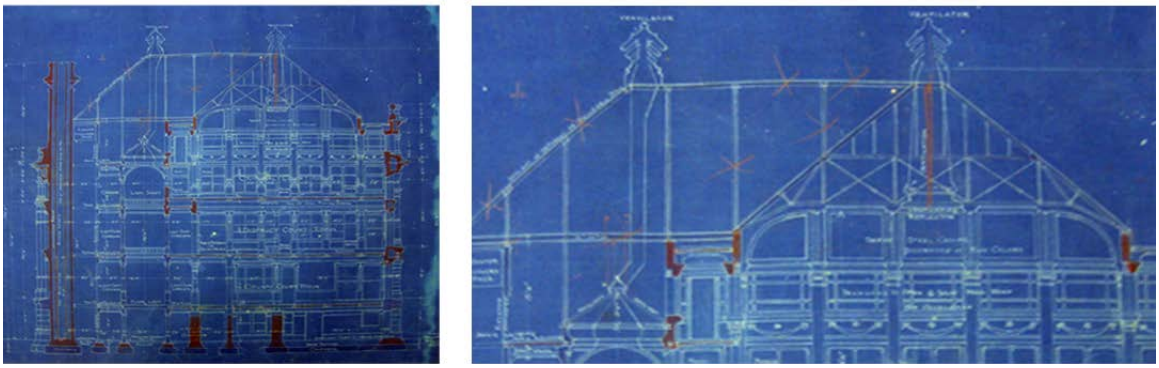

Figure 4. Galveston County Courthouse design by Nicholas J. Clayton (unbuilt), note ventilators at roof ridge.

Nicholas Clayton was not as explicit about the climate-mediating functions of his designs, but the principles at work in many of his building's plans and sections are generally the same as those in Gordon's Texas courthouses. Clayton's 1897 design for the Galveston county courthouse (Figure 4) shows a similar internal venting shaft, but its terminus is not as boldly expressed as Gordon's domes and towers. A similar strategy was likely behind the configuration of Clayton's 1889 addition to Ball High School and the 1890 University of Texas Medical Department building. In view of these preceding and succeeding projects, Clayton's Gresham house likely draws on the same principles as those described above (Figure 5). Although original plan and section drawings for the residence that could more clearly indicate Clayton's intent no longer exist, notes taken in his office diary during the design of the house record Clayton's discussion with the client

[58] James Riely Gordon (1863-1937) Drawings and Papers, c1890-1937, the Alexander Architectural Archive, the General Libraries, the University of Texas at Austin, Folder GOR 8-12.

about details of airflow, suggesting the removal of a door from a particular side of a bedroom "so as not to hinder in obstruction of breeze."[59]

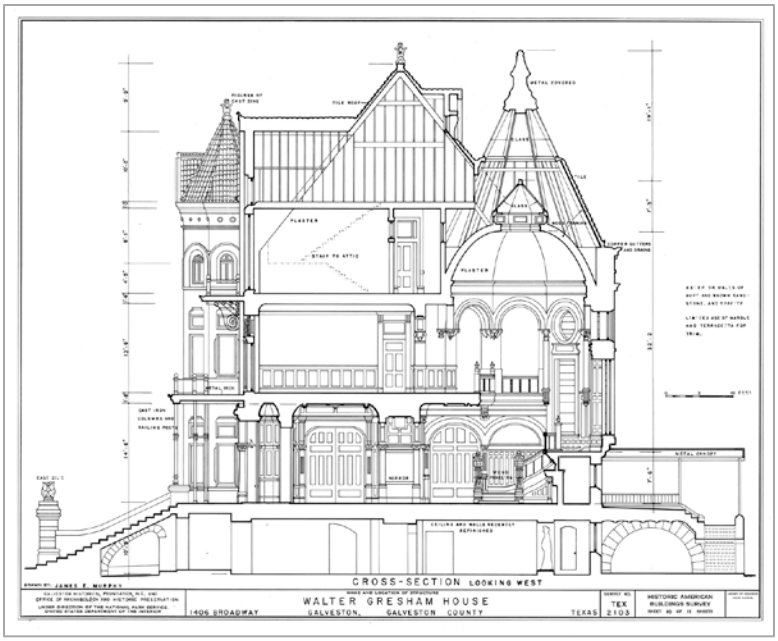

Figure 5. Nicholas J. Clayton's Gresham House (now called Bishop's Palace) Historic American Building Survey drawing

Although these plan and section formation strategies clearly operated within the constraints of a particular style, architects sometimes used the choice of the style itself as a climate mediation strategy. Although it was not always the primary rationale, appropriateness to climate was often cited in architects' written justifications for choosing a particular historical style. Clayton, in describing his choice of Italian Gothic as the style for a Roman Catholic Church in Macon, Georgia, notes, "This pleasing example of a picturesque medieval style will prove a new departure in the design of our ecclesiastical structures in the Southern States…this style is particularly adapted to the climatic conditions of the Sunny South."[60] Other sources note the generic popularity of the Italianate style in the South because its primary features, deep eaves and "Tuscan towers," were "thought to address the southern climate" by respectively providing shade

[59] Entry for May 27, 1887 in Nicholas J. Clayton and Company Standard Diary, Nicholas Joseph Clayton Papers, 1874-1915, Rosenberg Library, Galveston, Texas.
[60] Letterpress book, Nicholas J. Clayton Papers, 1896-1910, Dolph Briscoe Center for American History, The University of Texas at Austin, Box 2C449

and ventilation.[61] Some authors pose that James Riely Gordon's choice of the Romanesque style for many of his courthouse designs is based on climate in that it "allowed him to manipulate typical Romanesque forms such as the tower and functionally adapt it as the center of his ventilation system," although the present essay's author has found no evidence to date in which Gordon consciously states as much.[62]

This practice was not limited to architects with practices based only in the South. An account of University of Texas' new library's design published in 1912, notes that Cass Gilbert, a New York-based architect, "chose a modified Spanish Renaissance as the style best suited to the traditions of the southwest and the semi-arid climate of the region."[63] However, Gilbert's rationale for such a choice was not based solely on climate conditions, but rather a mix of visual and thermal considerations with cultural associations of climate, landscape, and history. Gilbert reasons that "In that country the light is brilliant, the sky cloudless through most of the year, and vegetation scanty except for a month or two in the spring. Therefore broad white wall surfaces, a deep cornice and free use of color fit naturally into the surroundings."[64]

Although climate was a factor in style choice, it could just as easily be abandoned if the cultural associations with a particular style not suited to the southern climate were strong or prevailing popularity of particular styles changed. In his church designs, Nicholas Clayton clearly understood that a congregation's cultural and religious associations with its land of origin were more essential that any climatic parallels. A description of St. Patrick's Church in Denison, Texas, notes that Clayton chose the

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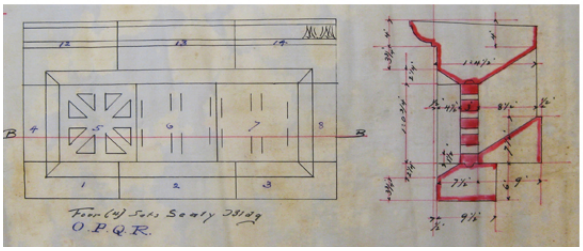
[61] Paula Mohr, "Architecture," in *The South, part of the Greenwood Encyclopedia of American Regional Cultures*, eds. Rebecca Mark and Rob Vaughn (Westport, CT and London: Greenwood Press, 2004), 17.
[62] Vivan Silverstein, "The Law and James Riely Gordon," *Texas Bar Journal* (Oct 1982): 1308.
[63] Nathaniel Goodrich, "University of Texas Library," *Library Journal* (June 1912): 325-326.
[64] Nathaniel Goodrich, "University of Texas Library," *Library Journal* (June 1912): 325-326.

"prevailing Gothic Style of ecclesiastical structures in Northern Europe, during the thirteenth century, for the design of this Church."[65]

The third strategy deployed by some architects in the American South was the insertion of vents, flues, and "solar chimneys" into the conventional details associated with the prevailing popular styles. It is in Clayton's larger commercial and ecclesiastical projects where this strategy is most evident. At both the 1891 Adoue and Lobit Building and the 1896 Ball-Hutchings-Sealy Building, Clayton unobtrusively inserts venting blocks into the decorative scheme of the building facades (Figures 6-8).



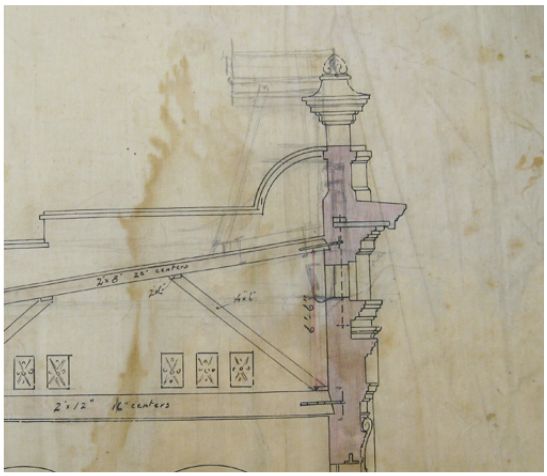


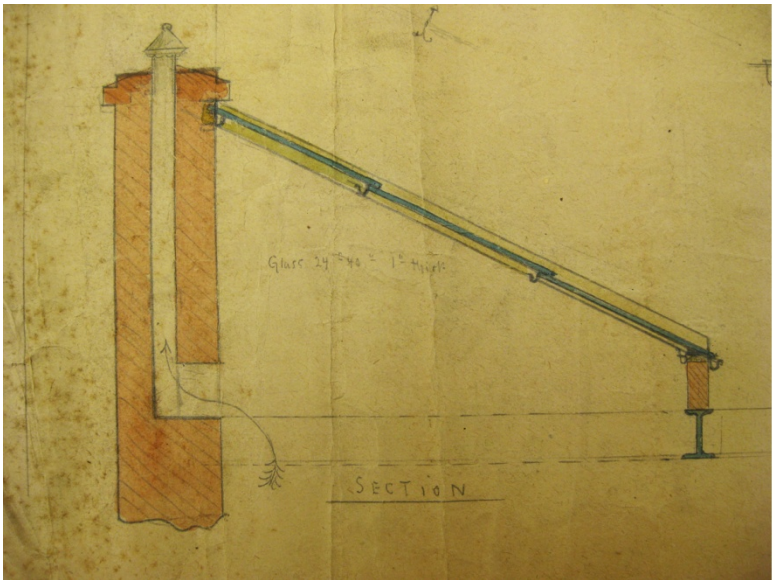
Figure 6. Venting blocks in Adoue & Lobit elevation (left top);

Figure 7. Detail of venting block from Ball-Hutchings-Sealy Building (left bottom);

Figure 8. Section through Adoue & Lobit venting block (right)

[65] Description of St. Patrick's Church, Denison, TX to *The Southern Messenger*, San Antonio, TX, Nov 12, 1898 [likely written by the firm], Letterpress book, Nicholas J. Clayton Papers, 1896-1910, Dolph Briscoe Center for American History, The University of Texas at Austin, Box 2C449

To the casual passerby, the function of these blocks would not be readily evident; rather they would be read as simple elaborations of the eclectic styles in use on the facades. Clayton takes this strategy one step further at the 1884 Galveston Daily News Building, where he essentially creates a solar chimney effect, using solar energy to drive upwards convection of the building's air. He accomplishes this by weaving a small vent shaft into the building's parapet and covering the adjacent roof area with a skylight (Figure 9). In his 1898 plans for St. Matthew's Church in Monroe, Louisiana, Clayton disguises ventilation flues within the church pinnacles (Figure 10). The meticulous construction details for each of these projects imply that these concealed elements were not likely standard features or whimsical afterthoughts to the design. Rather, they appear to be elements of an integrated strategy to provide increased ventilation—and by extension comfort—to the building occupants.



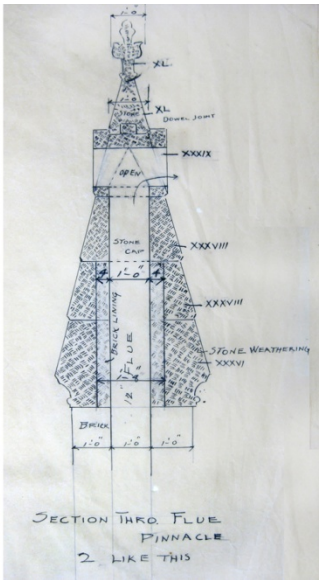


Figure 9. "Solar chimney" at Galveston Daily News Building (left)

Figure 10. Ventilation flue in pinnacle (right)

NOT SO "UNCOOL"

Chroniclers of American architectural responses to the external climate have typically viewed most architects of the late nineteenth and early twentieth century with a Modernist bent. These early architects are dismissed as frivolously devoted to the historical styles without much thought given to thermal comfort functions. At the other end of the spectrum, vernacular solutions to climatic issues are heroically celebrated at the expense of consciously designed environments, even though it is questionable that vernacular strategies could provide adequate resolution for thermal comfort problems inherent in larger building types.

Given the above discussion, it is clear that architects in the American South were thoughtfully responding to the "monster" problem of summer heat with integrated architectural strategies, although these strategies were not always boldly expressed as "new" or "modern." However, a methodology for elucidating this environmental history must be predicated on identifying the cultural, political, and social factors that constrain the architectural response. By recognizing what these architects were working against, it is easier to understand what they achieved and by extension what strategies may have been the most vital. Yet this is only half the story. The buildings discussed above were not always empty and their use was never static. Further research is needed to characterize the inhabitants' responses to these cooling strategies and to establish seasonal patterns of occupation and user adjustments to spaces. In full view of the past, we may see paths towards the future.

Chapter 3: Case Studies

This chapter investigates three case studies with the goal of understanding, in a contemporary context, the potential as well as the limitations of historic properties as sites for the interpretation of historic indoor conditions. Although the case study buildings do not vary tremendously in age, scale, sophistication of operator, or current use, key differences such as state of renovation, interpretive or educational mission of operator, and type of original ventilation system informed the selection of buildings for study. None of the case studies should be taken as a comprehensive or ideal model, but each offers some insights that taken together with current research in the field could be of beneficial use in a more comprehensive future project.

Each case study first introduces the institution that owns or operates the case study buildings, noting the preservation or educational mission of the organization. The case study building's original ventilation system and changes to it over time are then described. With this background established, each case study then considers the potential "venues for interpretation," including the perspectives of the building operators towards the original systems and the strategies they have applied or could apply to interpretation of those systems. Finally, scholarly research that offers insight into possible future directions for each case study situation is noted.

CASE STUDY #1: TEXAS HISTORIC COURTHOUSE PRESERVATION PROGRAM COUNTY COURTHOUSES

The Texas Historic Courthouse Preservation Program (THCPP) is a unit of the Texas Historical Commission, the governmental organization that implements national and state historic preservation programs. The Texas Legislature founded the THCPP in 1999 and appropriated funds to the program to be granted to individual Texas counties for restoration work on their historic county courthouses. Many of the historic

courthouses that have benefitted from the THCPP grant program were built in the late nineteenth and early twentieth century after the Texas Legislature passed a law in 1881 that allowed Texas counties to issue bonds to fund courthouse construction.

Figure 11. Goliad County courthouse (east elevation) prior to renovation

At the time they were built, many of the turn-of-the-century courthouses were the largest and most complex buildings in their respective counties, many of which are in rural areas with low populations. That they were built at a time before air conditioning was widely available or used in non-industrial building makes the Texas historic county courthouses particularly interesting for this study. A number of these courthouses were designed by J. Riely Gordon, whose building-scale ventilation and cooling strategies are described in the previous chapter, but further investigation revealed that many of the courthouses of this time period not designed by Gordon also incorporated methods for building ventilation.

Goliad County Courthouse, Goliad, TX

Designed in 1894 by Henri E.M. Guindon, the Goliad County courthouse is a three-story Second Empire style load-bearing masonry building (Figure 11).[66] The building has been continuously occupied by the county courts and received two additions in 1947 and 1964. Renovation and restoration work completed as part of the THCPP was

[66] The courthouse design is sometimes attributed to well-known Texas architect Alfred Giles because Guindon worked for Giles for many years and Giles later took credit for its design, but many sources state that Guindon is the designer of record.

completed in 2003. The preservation architect for the restoration was The Williams Company (now part of Lord, Aeck, and Sargent) of Austin, Texas.

When it opened, the Goliad courthouse featured a ventilation system consisting of numerous flues integral to interior and exterior walls (Figure 12). Although there is not currently available documentary evidence of how this particular system worked at Goliad, it was not an uncommon system for the time. Evidence revealed during the 2003 restoration project suggested that grilles at both the upper and lower part of the flues facilitated airflow within the room. THCPP project reviewer Mark Cowan noted remnants of pull cords in the building that suggested building occupants could actively regulate airflow within each room. It is unclear whether the system would be used continuously throughout the year or just during months when it was uncomfortable or impractical to keep the windows open.

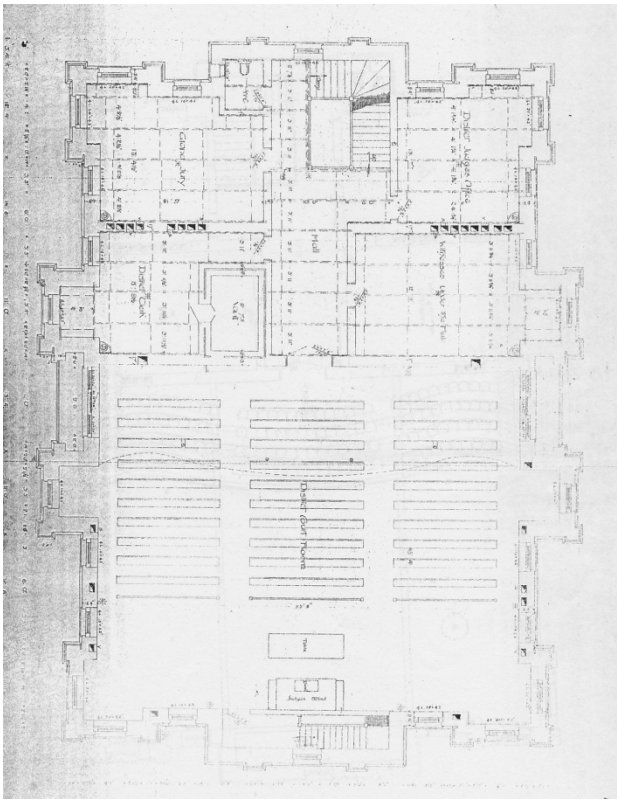


Figure 12. Caldwell courthouse plan, 1894 (Caldwell and Goliad courthouses were built from identical plans). Note ventilation shafts in walls, marked with shaded triangles.

If the system was similar to those published at the time, it is likely that the ventilation flues originated in the basement, traveled continuously through the walls, emptied into the courthouse attic, and vented through a main clock tower and four cupolas integral to the space. However, in 1942, a hurricane destroyed the clock

tower and four cupolas, and they were not replaced and the openings into the attic capped over.

The county installed air conditioning in the Goliad courthouse in 1964, seventy years after its original construction. This decision to install climate control came after a debate among county residents whether to renovate the existing 1894 courthouse or to demolish it and build a new "modern" courthouse. The county chose the option for "modernizing the antiquated structure" instead of new construction because as one member of the community saw it, a new courthouse would "have an adverse affect on Goliad's 'atmosphere,'" a tragic occurrence for "atmosphere is about all that Goliad has."[67] Aside from dropped ceilings to accommodate mechanical ducts, other items in the 1964 renovation included an small addition to house new mechanical equipment, new restrooms, and space partitions in select rooms. A limited project in 1996 installed new air-conditioning equipment.

The authors of the master plan noted the original ventilation flue system in document illustrations, but do not describe its presence or potential function in the text, as it was not required by the THCPP, and such a description would not be part of common preservation analysis unless specially requested by the client. The engineering report for mechanical, electrical, and plumbing systems included in the master plan report analyzed only the 1964 and 1996 mechanical equipment and ducting and did not note the original flue ventilation system, again as would be expected in common contemporary practice.

[67] "Court House Issue Left 'Up in Air' As Commissioners Weigh Proposals, Goliad, Texas, *The Advance Guard*, 16 June 1960.

Figure 13. Goliad County courthouse (north elevation) after restoration.

The 1999 Historic Courthouse Master Plan required by the THCPP application for grant funding chose restoration as the treatment approach for the proposed courthouse project (Figure 13). Functional reinstatement of the original ventilation system was of course not included in the project, but visual elements of the original system were re-installed and thus provide potential for current and future interpretation efforts. Both the project architects and the county clients considered the replication and installation of the original clock tower and cupolas that had been destroyed by the 1942 hurricane an important element of the restoration project, although they are no longer open to the attic and thus could not easily be reinstated to their original function as part of the ventilation system. However, it was the project reviewer for the THCPP who advocated for reinstallation of replica ventilator grates at the original ventilation flues in the District Courtroom.[68] Although the grilles are installed "blind" (they do not open to the shafts behind), they serve as visible indicator of the historic ventilation system.

Comal County Courthouse, New Braunfels, TX

Designed by J. Riely Gordon and completed in 1898, the Comal County courthouse is as three-story Romanesque Revival style building located in New Braunfels, Texas. The building has been continuously occupied by county courts and

[68] The Williams Company, "Architect's Field Report, July 10, 2003," Project Completion Report for the Restoration of the Goliad County Courthouse of 1894, January 2002, THCPP files, Austin, TX.

received two additions in 1931 and 1952. Renovation and restoration work completed as part of the THCPP was completed in 2012. The preservation architect for the restoration was Volz and Associates of Austin, Texas (Figure 14).

Although the commission was for a relatively small building, Comal County courthouse is one of J. Riely Gordon's "Signature Plan" courthouses, and thus the original ventilation system functions generally as described in chapter two. A document in Gordon's papers highlights the cooling features of the Comal courthouse specifically, comprising "ample rooms… all of which have openings into spacious colonnades with granite columns, tile floors, etc., making a very admirable feature in this southern climate."[69]

Air conditioning was installed at the Comal courthouse in 1966, yet the Gordon's ventilation system may have been compromised as early as 1899. An entry in the Commissioner's Court minutes from November of that year notes that a county judge was "authorized to have the windows of the courthouse fixed…to keep the rain out," although it is not clear whether this was a permanent condition because the original double-hung wood windows at the courthouse were replaced with aluminum sash, likely in the 1950s.[70] In 1926 one of the outdoor porches that Gordon suggested would be "a very admirable feature" in the southern climate was enclosed to provide an emergency office. The 1931 and 1952 additions further compromised the original ventilation and cooling system by engulfing two of the four, corner air "funnels," as Gordon called them.

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[69] "Description of Comal County Court-house," James Riely Gordon (1863-1937) Drawings and Papers, c1890-1937, the Alexander Architectural Archive, the General Libraries, the University of Texas at Austin, Folder GOR 8-12

[70] Entry from November 14, 1899, vol H p494, referenced in Comal County Courthouse Master Plan, Volz and Associates, 2005.

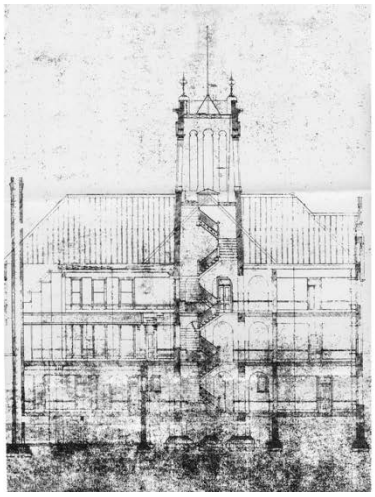


Figure 14. Comal County courthouse (east elevation) prior to restoration (left)

Figure 15 Comal County courthouse section showing skylight at base of tower (right)

Although they do not explicitly describe Gordon's ventilation strategy, the authors of the 2005 Courthouse Master Plan are clearly familiar with Gordon's other courthouse designs. In analyzing the conditions of the skylight at the top of the interior stair atrium, the architects refer to Gordon's original section drawing of this feature and recognize two tower configurations in Gordon's work, "central towers" with skylights and "offset towers" with no skylights. However, the master plan's engineering report, like that of the Goliad courthouse, considers only existing mechanical equipment and does not investigate the building's historic ventilation strategy (Figure 15).

Yet although they did not articulate it as such, the architects for this project restored much of Gordon's original ventilation system and provisions for cooling. By removing the 1931 and 1952 additions, reopening exterior porches, and replacing original materials, the architects made it possible to more clearly interpret the original system and to possibly re-activate it (with adjustments for relevant code compliance) in the future should that become the desire of the building owner.

A similar circumstance occurred at the Fayette County courthouse, another Gordon design from 1891. The interior atrium of that Fayette County building had been filled in with floor slabs to provide additional square footage for offices, blocking the connection of lower floors with the atrium space. A THCPP-funded restoration project in 2005 removed those encroaching floors, installed a skylight at the top of the atrium, and re-activated the fountain in this space. Although the central core was originally open-air in Gordon's design, the restored atrium again provides more opportunities to interpret the original cooling system and possibly to re-activate it in the future.

Venues for Interpretation: THCPP Stewardship Program

In 2006 the THCPP started a public-private partnership with Texas Land Title Association to establish the Texas Courthouse Stewardship program. The Stewardship program provides training workshops and expert technical assistance for county stewards of courthouses restored through the THCPP program. This program is an excellent conduit to understand problems that may encourage occupants to make imprudent building alteration decisions, and it has potential as a site to communicate new ideas about traditional-building occupancy. For example, the Stewardship Program acts as a venue for stewards of restored historic courthouse to express concerns, such as increasing energy bills due to full-building air conditioning, especially where the building prior to restoration was only partially conditioned with window units, and about scarcity of building environmental controls experts for the many of the courthouses located in rural and remote areas, which often means that new building systems may not be operating at full efficiency after original installation. Although the courthouse occupants may not necessarily be willing to make comfort sacrifices at this point, they may, given the challenges noted above, in the future be open to more "low-tech" solutions for occupant

comfort, that is hybrid systems that utilize some original building-based ventilation and cooling strategies.

Relevant Research: Past Performance Modeling

Contemporary building energy and indoor conditions modeling offer particularly useful insights in situations where energy costs are a primary concern. Anat Geva, in her work with historic buildings, has been deploying building modeling in valuable ways that demonstrate the environmental capabilities of historic buildings. Her methodology for modeling focuses on comparing a model of a historic building in its current condition to a model in its original (historic) condition. This is accomplished by simulating in the model the removal of "improvements" made to the original design, such as sealed windows, air-conditioning systems, and carpet covering thermally massive stone floors. Through this model comparison, Geva has shown that significant improvement in comfort and energy performance would be achieved by restoring natural ventilation in a church building in Texas.[71] The same result was noted by Geva in her work with rehabilitations of 1930s-era international style apartment buildings in Tel Aviv; models showed that restoration of the original passive features of historic buildings provided higher comfort and lower energy use than the existing conditions, where deep balconies were enclosed and air conditioning window units had been added.[72]

Despite some limitations, computer models and simulations have significant persuasive potential. Although the context and purpose were different, computer models of potential fire and smoke propagation in the historic Tweed courthouse in New York City provided adequate evidence for fire-safety officials to approve alternative

[71] Anat Geva, "Energy Simulation of Historic Buildings: St. Louis Catholic Church, Castroville, Texas," *APT Bulletin* 29 no. 1 (1998): 36-41.
[72] Anat Geva, "Rediscovering Sustainable Design Through Preservation: Bauhaus Apartments in Tel Aviv," *APT Bulletin* 39 no. 1 (2008): 43-49.

approaches to fire safety that did not adversely affect historic fabric.[73] The architects of the 2011 THCPP-sponsored restoration of the 1910 Harris County courthouse in Houston, Texas, took a similar approach to that taken at Tweed. They used simulation and modeling to provide evidence to the local fire safety official that their proposed system of smoke-event activated roll-down fire doors would provide an adequate level of safety. Building models and simulations have similar potential to help designers and occupants alike realistically evaluate alternative approaches to thermal comfort and ventilation in historic buildings. While operational and historical circumstances make each case unique, it may be possible to provide non-conventional options for energy use reduction, including using historic ventilation and cooling systems in standard building operation.

CASE STUDY #2: GALVESTON HISTORICAL FOUNDATION BISHOP'S PALACE

Founded in 1954, the Galveston Historical Foundation (GHF) is the primary non-profit preservation organization in Galveston, Texas. GHF is large relative to preservation organizations in cities of similar size and has won numerous honor awards from the National Trust for Historic Preservation, the American Institute of Architects, and the Texas Governor's office. As the steward and operator of a number of historic nineteenth and early-twentieth century properties in Galveston, the GHF has a sophisticated preservation and education staff. GHF has also shown a strong commitment to environmental sustainability through its Green Revival and other programs.

[73] John G. Waite and Nancy A. Rankin, "Tweed Courthouse: New Approach to Life-Safety Management in a Landmark Public Building," *APT Bulletin* 35 no. 1 (2004): 15-21.

Bishop's Palace

The William Gresham house, commonly known as "Bishop's Palace," is a historic house museum operated by GHF (Figure 16). The Bishop's Palace is a particularly interesting structure because museum staff note that this large residential masonry building stays remarkably cool in the extraordinarily hot summers of Galveston, Texas. The large Victorian home was designed by Nicholas Clayton and built between 1887 and 1892 for Galveston attorney and railroad entrepreneur William Gresham and his large family, which owned the house until 1923, when they sold it to the Roman Catholic diocese of Galveston. The Bishop of the diocese lived for many years at the house, hence its nickname "Bishop's Palace," and made some alterations including conversion of a second floor bedroom to a chapel and addition of a non-operable skylight in the roof above the third floor staircase. In 1963 the Diocese moved its operations to Houston to serve the growing population there and began operating the house as a historical museum. In 2007, the Diocese transferred operational management of the house museum to the Galveston Historical Foundation but retained ownership of the property. The GHF is currently raising funds to repair and restore the house with the intent that ownership of the building will transfer to GHF in the future.

Figure 16. Gresham House (now called Bishop's Palace)
Historic American Building Survey photograph

The original ventilation and cooling strategies at Bishop's Palace follow principles similar to those at J. Riely Gordon's Texas courthouses, with emphasis on "catching the breezes" that regularly come from the nearby Gulf of Mexico. Large walk-through windows on the first floor windows admit large quantities of air that

are pulled through the house by the thermally-driven buoyancy generated by the “solar chimney,” a ventilating skylight positioned above the large main stair at the center of the house (Figures 17-18).

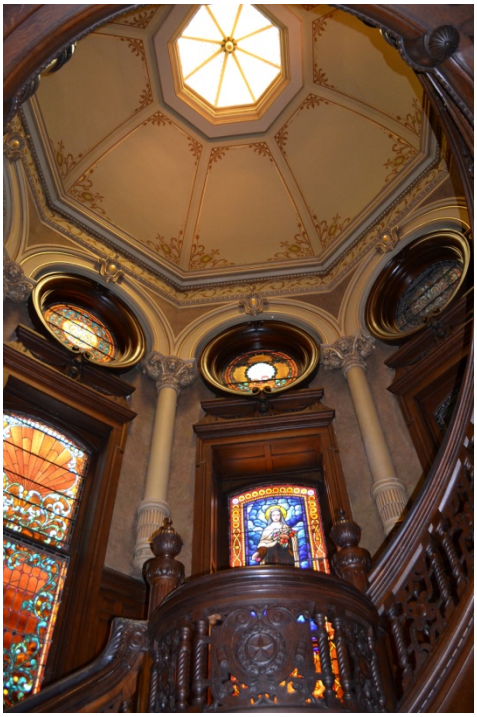


Figure 17. Ventilating skylight over main staircase at Bishop’s Palace (left)

Figure 18. Ventilator above main stair skylight at Bishop's Palace (right)

Sliding pocket doors allow all rooms on the first floor to connect as one large open space, which facilitates the movement of air. Interior windows and over-door transoms on the second floor connect private bedrooms to the solar chimney stack (Figure 19). Large wall transoms on the third floor allow for adjustment of airflow in the front rooms (Figure 20). A secondary stairwell that connects service areas likely also acted as a solar chimney when the family closed off service areas from the rest of the house, although it is unclear exactly how this secondary system worked. A small window

at the top of this stairwell may have facilitated some airflow, but it is possible that there was a skylight driving the system. A relatively contemporary-looking fixed skylight at the top of the stairwell may have replaced an earlier ventilating skylight, but no evidence for this has been located yet.

Figure 19. Interior windows connect spaces to solar chimney stack at Bishop's Palace

A ducted air-conditioning system was added to the basement of Bishop's Palace, although the installation date of this system is currently unknown. The first and second floors of the house are cooled with a number of window-mounted air-conditioning units placed in nearly all rooms (Figure 21). Spaces on the third floor and in the attic are left unconditioned. The window units are in service from approximately April through November, and when in service are on continuously for twenty-four hours a day to keep indoor conditions stable. The window units are eminently "reversible;" they are removed for the seasons they are not in use. The operational patterns of the ducted system in the basement are unknown at this time. Because the Diocese has not yet transferred ownership, the GHF cannot prudently make any major investment in the building at this time, but the organization is planning for a major restoration and repair project at Bishop's Palace once they obtain ownership.

Venues for Interpretation: GHF Special Events

The GHF has a general understanding of the original ventilation and cooling systems, and organization leadership is interested in capitalizing on both its practical and

interpretive benefits. In 2010 they collaborated with the University of Texas at San Antonio's historic preservation program to study the general ventilation patterns within the house and to produce a presentation board with an interpretive diagram and simple explanatory text describing the system. Although the diagram may not be entirely correct in terms of building air flow, it seems to be a useful tool for the staff in comprehending the system's function.

Figure 20. Large in-wall transoms on third floor at Bishop's Palace

Not all GHF staff guides who give daily building tours at Bishop's Palace emphasize the presence of the original ventilation system, although informal discussion with select tour guides reveal that they are aware of its existence and enthusiastic about its function. Because the original ventilation system is not in active use during the warmer months (windows are closed to maintain conditioning of space), it is understandably challenging for a tour guide to fully interpret the unusual system, although they are able to point to the visual elements of the system (transoms, indoor windows, and skylight).

Relevant Research: Drayton Hall Monitoring and Operations Plan

Drayton Hall, the National Trust's historic site located outside Charleston, South Carolina, is a clear example for potential insights relevant to Bishop's Palace. Drayton Hall is an early eighteenth century plantation house that is unusual for its lack of any modern building systems such as plumbing or electricity, and it has been the subject of recent innovative monitoring and operations research. Bishop's Palace museum staff are

aware of the Drayton Hall no-systems model but have concerns about the willingness of Galveston tourists and visitors to embrace an unconditioned or less-conditioned experience on a building tour. Bishop's Palace is currently a revenue-generating property, and GHF is understandably apprehensive in undertaking any dramatically unconventional approaches in terms of visitor comfort.

Figure 21. "Reversible" cooling with window units at Bishop's Palace

Nonetheless, should GHF make a choice to operate Bishop's Palace with less air conditioning, the methodologies developed at Drayton Hall would likely prove useful. Although their aims were toward materials conservation more than thermal comfort or energy performance, Michael Mills and George Fore's monitoring study of Drayton Hall presents an excellent methodological approach for data collection across multiple factors at an existing historic site. Data from many different elements of the building were gathered over all seasons and controlled against weather patterns and organizational operations.[74] This data was then interpreted into an operations plan for the building staff that would optimize protection of historic materials.

While these concepts have potential to be applied to historic sites that choose to interpret a historic building's original climate mediation systems, the situation remains complex. Michael C. Henry describes the challenges experienced at Drayton Hall, where

[74] Michael J. Mills and George Fore, "Environmental Monitoring and Conservation Study of Drayton Hall in Charleston, South Carolina," *APT Bulletin* 31 no. 2/3 (2000): 63-70.

his team installed an active monitoring and real-time operating advisory system that recommends to building staff when to operate elements of the building (shutters, doors, etc) for maximum efficiency and protection of sensitive historic building fabric. Building staff behavior changed somewhat in response to the monitoring data, but the advisory system was eventually shut off because it conflicted with tour schedules and other operational preferences.[75]

Awareness of these potential pitfalls is also instructive for the situation at Bishop's Palace. Michael Henry's challenges at Drayton Hall suggest a more collaborative approach to monitoring-operations efforts is needed. Instead of developing the operations plan separately from interpretive and preservation staff, an alternate approach could directly engage enthusiastic staff members to actively manipulate the system and learn by trial and error with feedback from advance monitoring equipment and building visitors. The interpretive staff at Bishop's Palace in fact already actively manipulate some of the building's traditional technologies for comfort. In recent months the staff have adjusted the interior wooden blinds to control light and heat gain throughout the day. Although there has not been a meticulous study to track the concrete effects of these adjustments, staff report anecdotally that this practice does mitigate some of the extremes of temperature.

CASE STUDY #3: UNIVERSITY OF TEXAS AT AUSTIN, BATTLE HALL

Founded in 1881, the University of Texas at Austin is a large public research university with a strong architectural tradition and a contemporary commitment to environmental sustainability. Looking to define a unified architectural presence for the

[75] Michael C. Henry, "The Heritage Building Envelope as a Passive and Active Climate Moderator: Opportunities and Issues in Reducing Dependency on Air-Conditioning," (contribution to the Experts' Roundtable on Sustainable Climate Management Strategies, Tenerife, Spain, April 2007).

university, the university regents in 1910 hired Cass Gilbert, a well-known New York-based architect, to develop a campus master plan and design some of its premier buildings, including a new university library (now Battle Hall). Gilbert's plan and aesthetic choices still serve as a model and guide for current university development. More recently, the university launched a campus sustainability initiative, with the establishment of the President's Sustainability Steering Committee in 2007, the adoption of a Campus Sustainability Policy in 2008, the hiring of a Director of Sustainability in 2009, and the subsequent establishment of the Office of Sustainability, whose mission is to "support and promote the many existing efforts on campus as well as to initiate new collaborations among students, faculty, and staff in pursuing sustainability on campus."[76]

Battle Hall

When it opened in 1911 the building later named Battle Hall served at the university's main library and housed administrative offices of university officials (Figure 22). The library moved to the university's new Main Building in 1937, after which Battle Hall was occupied by the Fine Arts department until 1948, when the Barker Texas History Center moved in. The Barker Center remained in Battle Hall until 1973, and during their occupancy the West Mall Office Building was constructed in 1961 immediately adjacent to the west façade of Battle Hall. From 1973 to 1979, the building was occupied by a variety of library and office functions, and in 1979 the Architecture Library and School of Architecture became the primary occupants. Aside from relatively minor interior renovation and exterior treatment projects, Battle Hall has not experienced a major renovation since its opening in 1911.

[76] University of Texas at Austin Office of Sustainability, http://www.utexas.edu/operations/sustainability/

Figure 22. Battle Hall (east elevation)

The original ventilation system at Battle Hall represents a hybrid approach. The design relied in part on buoyancy-driven principles similar to those at J.Riely Gordon's courthouses and Clayton's Gresham house, but it was supplemented by a mechanically-driven ventilation system that actively forced air through ducts to the stack area, reading room, and offices. The natural ventilation system centered on a large ventilating skylight positioned above the current circulation desk and a secondary ventilated skylight above the elevator shaft, although it is unclear whether the ventilator in the elevator shaft skylight was in place simply to allow pressurized air to escape as the elevator ascended (Figure 23). Presumably, the action of this system would draw air in through operable windows in the stacks and reading room and exhaust it through the louvers of the skylight. The original specifications for the building call for a damper for the main ventilating skylight to be located in the former Delivery Room (now circulation desk) for operation by "hand control." The specifications also called for installation of an alternate damper control mechanism that would allow for continued hand control operation when the stained glass skylight was installed.

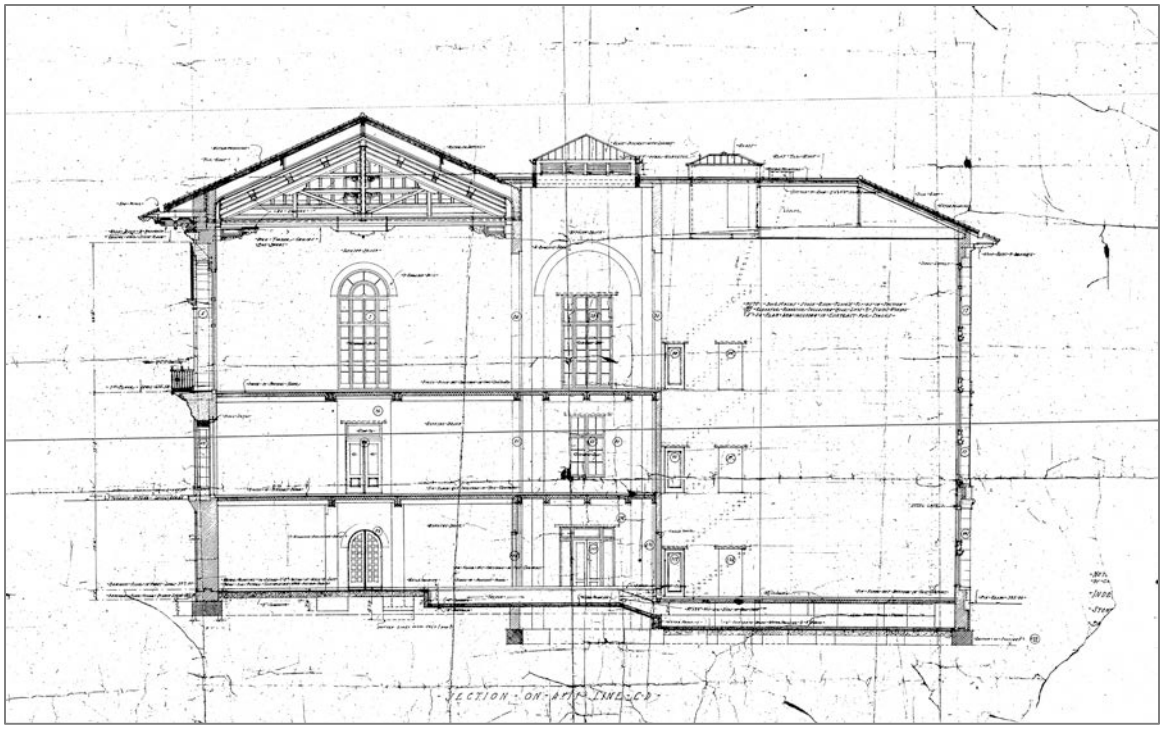


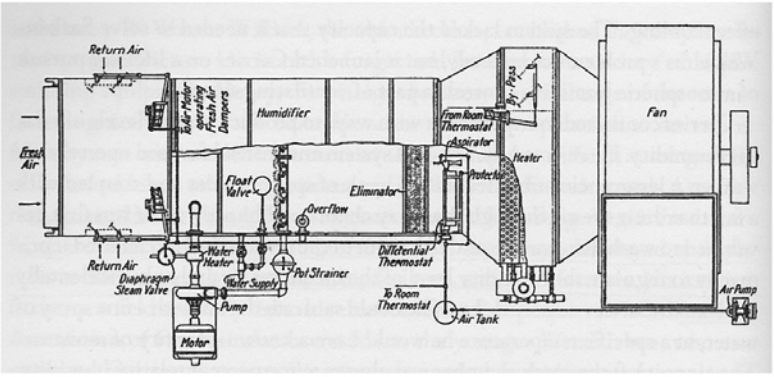
Figure 23. Section through Battle Hall showing central ventilating skylight and secondary skylight over elevator shaft

The mechanical system installed in 1911 was described by a university publication as an "up-to-date 'indirect' heating and ventilating system…whereby automatically washed, tempered and humidified air will be driven to every part of the building."[77] The system was highly innovative for its time. Although "air washers" had been used previously in an industrial production context to remove dust, dirt, fibers, or smoke from the air supply, engineers such as Willis Carrier began experimenting with them to control humidity in the air supply.[78] In fact, the diagram of Battle Hall's original mechanical system closely resembles one that accompanied an article published by Willis Carrier in the 1911 American Society of Mechanical Engineers (ASME) Transactions

[77] University Record (UT Record), vol X, no 3, Jan [18], 1911, p 220

[78] Gail Cooper, *Air-Conditioning America: Engineers and the Controlled Environment, 1900-196*0, (Baltimore: Johns Hopkins University Press, 1998), 25.

(Figure 24-25). This 1911 article was the first major publication in which Carrier documented his work on "air conditioning," a term that had only been coined a few years earlier in 1906 to mean artificial regulation of humidity.[79]



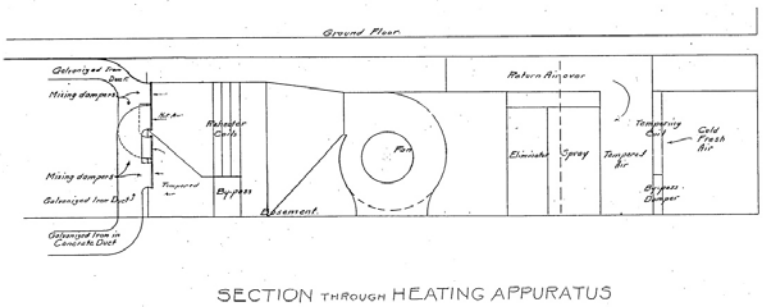


Figure 24. Diagram of Willis Carrier's 1911 "air conditioning" system (top)

Figure 25. Diagram of Battle Hall's original mechanical ventilation equipment (bottom). Note "humidifier" in Carrier's system and "spray" in the Battle Hall system

The question of how such an innovative mechanical system ended up in the relatively provincial Austin, Texas, in 1911 can be answered through the work of Cass Gilbert. At the same time he was designing Battle Hall, Gilbert was also designing New York's Woolworth Building, which included a similar air-washer system to that specified at Battle Hall, albeit on a larger scale. The same engineering company, Kauffman Heating and Engineering Company of St. Louis, Missouri, supplied the equipment to both projects. The system installed at the Woolworth Building is described as such:

[79] Gail Cooper, *Air-Conditioning America: Engineers and the Controlled Environment, 1900-1960*, (Baltimore: Johns Hopkins University Press, 1998), 26.

> The air is first received from the outside, drawn through water, discharged into the air in an atomized condition through "Kinealy" patented spray heads, and then drawn into what are called "eliminator" plates, which separate the air from the water. After leaving the eliminator plates, the air is free from all entrained moisture and delivered to the rooms; in the winter time heating and purifying, and in the summer cooling and purifying. During the summer the air in the different rooms is cooled to about twenty degrees below the outside temperature. The air is also delivered into the rooms with the proper percentage of humidity, which makes the rooms habitable.[80]

The intent of the air-washer system at Battle Hall was likely for comfort cooling and not just for air purification, as one 1912 report notes that "special effort has been made to ensure the comfort of users of the library and to economize the time and strength of the staff."[81] However, the degree of comfort offered by these air-washing systems was likely not as great as many of the manufacturers claimed, and they were most effective in areas of low humidity. By 1917, engineers had begun adding refrigeration to air-washing systems to exert more measurable control over the air temperature leaving the system. As Gail Cooper puts it in her comprehensive history of air conditioning, the addition of refrigeration was the point at which engineers were able to offer systems (primarily to movie houses) that moved "beyond mitigation of discomfort to the creation of an attractive alternative to outdoor amusements."[82] Thus, the mechanical portion of the hybrid system originally installed at Battle Hall represents an unusual transitional system in the history of indoor environmental management.

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[80] The Master Builders, *A Record of the Construction of the World's Highest Commercial Structure* (New York: Hugh McAtamney & Co., 1913), 63.

[81] University Record (UT Record), vol X, no 3, Jan [18], 1911, p 220

[82] Gail Cooper, *Air-Conditioning America: Engineers and the Controlled Environment, 1900-1960*, (Baltimore: Johns Hopkins University Press, 1998), 87.

Figure 26. Battle Hall (west elevation) prior to construction of West Mall Office Building

This hybrid system of air conditioning appears to have remained intact at Battle Hall into the 1950s, although it is unclear whether the system was operating as intended and whether occupants were aware of its existence. In a memo outlining recommendations for outfitting Battle Hall (then called the Old Library) for its new occupant, the Barker Texas History Center, a university official notes, "If air conditioning is impractical because of building structure, artificial ventilation with ample electric fans and exhaust fans should be provided in all areas. Because of the few windows in working and stack areas this is of primary importance."[83] Yet some familiarity with the equipment is noted in a 1947 memo of the University Building Committee, where it is noted that "Nothing definitive was stated relative to air conditioning though Mr. White expressed a desire to utilize as much as possible of the ventilation equipment installed in the building, particularly in the stack area."[84] However, by 1951, just two years after the Barker Center moved into

[83] Recommendations for reconditioning the Old Library Building, undated [possibly 1947], Dolph Briscoe Center for American History, The University of Texas at Austin, Box 4Za172, Folder: Barker Texas History Center, 1948-1959. The copy of this document researched for this thesis is maintained in the Battle Hall reference file available by request at the Alexander Architectural Archives, University of Texas, Austin, Texas.

[84] Memorandum of the Building Committee Meeting, Friday, Feb 21, 1947, regarding the use of the Eugene C. Barker Texas History Center, Dolph Briscoe Center for American History, The University of Texas at Austin, Box 4Za172, Folder: Barker Texas History Center, 1948-1959. The copy of this document researched for this thesis is maintained in the Battle Hall reference file available by request at the Alexander Architectural Archives, University of Texas at Austin.

Battle Hall, the author of the Center's annual report is calling for the installation of air conditioning, and the reasoning is framed in terms of an overall shift towards air conditioning on campus. The report notes that "air conditioning of more of the campus building increases the vigor of protests over restrictions of the use of rare books to the sizzling reserve study…"[85] By 1954, the university was soliciting quotes for air conditioning of the entire building.[86] Full-building refrigerated air conditioning was finally installed at Battle Hall in two phases between 1963 and 1966, just shortly after the construction of the adjacent West Mall Office Building, which blocked all the operable windows in the stack area of the building (Figure 26). The air-conditioning system was renovated in 1982, soon after the School of Architecture took over the building.

Venues for Interpretation: Renovation and Class Participation

The university is currently planning a major project in both Battle Hall and West Mall Office Building, which at a minimum will address life safety code compliance and at a maximum create a model of "sustainable preservation" for the School of Architecture and Architecture Library. This endeavor offers numerous opportunities for discovery and interpretation of the original hybrid ventilation and cooling system in Battle Hall. As students, faculty, and the design architects begin to explore the building in preparation for the renovation project, the effort could take on an archaeological approach, tracing the remnants of the old system, reconstructing how it worked, and modeling how it performed. If integrated into School of Architecture "Environmental Controls" classes,

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[85] Second Annual Report of the Baker Texas History Center, 1951, Dolph Briscoe Center for American History, The University of Texas at Austin, Box 4Za172, Folder: Barker Texas History Center, 1948-1959. The copy of this document researched for this thesis is maintained in the Battle Hall reference file available by request at the Alexander Architectural Archives, University of Texas at Austin.

[86] Memo recording discussion between Texas State Historical Association and the President regarding converting Old Library Building into Barker Texas History Center, April – May, 1954, UT President's Office Records, 1907-1968, Box VF 20/A.a

investigation of the original hybrid system could inform learning about innovative contemporary hybrid systems and insight reflection on contemporary conventional cooling systems.

Relevant Research: Getty Conservation Institute

Between 1997 and 2010, the Getty Conservation Institute (GCI) sponsored two long-range projects investigating environmentally and economically sustainable approaches to climate control for archival and artifact collections housed in historic buildings. The first initiative, Collections in Hot and Humid Environments, "researched alternatives to conventional air conditioning systems by studying the control of relative humidity through ventilation and heating, while allowing larger variations of temperature."[87] The second initiative, Alternative Climate Controls for Historic Buildings, engaged expert engineers to apply those strategies through controlled installations at five locations in the United States, Brazil, Spain, and China.

Two sites studied in the Alternative Climate Controls for Historic Buildings initiative could offer insights for renovation planning at Battle Hall, should the university take want to take on a highly innovative approach to environmental control. In their research at Hollybourne Cottage on Jekyll Island, Georgia, Getty Conservation Institute scientists Shin Maekawa and Vincent Beltran, with museum studies professional Franciza Toledo, considered alternatives to conventional air conditioning for maintaining appropriate non-deterioration conditions that were "economical, robust, technologically simple, and required minimal structural modification of the historic building."[88] Through a combination of heating, ventilation, and dehumidification, the researchers were able to

[87] Getty Conservation Institute, Collections in Hot & Humid Environments (1997-2002) http://www.getty.edu/conservation/our_projects/science/hothumid/index.html
[88] Shin Maekawa, Vincent Beltran, and Franciza Toledo, "Testing Alternatives to Conventional Air-Conditioning in Coastal George," *APT Bulletin* 38 no. 2/3 (2007): 3-11.

achieve beneficial conditions at a "fraction of the energy budget for a typical HVAC climate-control system."[89] However, the research at Hollybourne Cottage was focused exclusively on building material preservation, not collections preservation or occupant comfort, as the cottage is typically unoccupied for most of the year.

However, another GCI initiative project, located at the Casa de Rui Barbosa house museum in Rio de Janeiro, Brazil, experimented with similar alternative climate-control systems with the added constraints of collections preservation and occupant comfort. The experimental climate-control installation in both storage and non-collection spaces of the Casa di Rui Barbosa successfully produced conditions that "minimizes risk for collections in a manner that, relative to conventional HVAC systems, is low in cost, is easy to use and modify, and requires little maintenance," and provided for "human comfort within the boundaries of an appropriate environment for collections."[90]

CASE STUDY CONCLUSIONS

These case studies, while not intended to be representative of all possible circumstances, show that there is distinct potential for interpretation of historic building ventilation and cooling systems at historic sites. First, there is a general desire reduce energy use for air conditioning, whether to achieve cost savings alone or to serve as a model for other institutions in addition to reducing costs. This desire will likely make building operators and occupants more interested in information about or experimentation with alternative lower-energy ventilation systems, if they can be reconciled with perceived comfort. Second, the physical integrity of historic ventilation systems has been

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[89] Shin Maekawa, Vincent Beltran, and Franciza Toledo, "Testing Alternatives to Conventional Air-Conditioning in Coastal George," *APT Bulletin* 38 no. 2/3 (2007): 10.

[90] Shin Maekawa and Vincent Beltran, "Collections Care, Human Comfort, and Climate Control: A Case Study at the Casa de Rui Barbosa Museum" *Conservation Perspectives, The GCI Newsletter* 22.1 (Spring 2007)

maintained—whether intentionally or not—such that there are enough material remnants around which to build a meaningful interpretive program in all locations. Recent renovations at the Texas county courthouses have even restored some integrity to original ventilation systems. There also appear to be a number of existing venues for interpretation. New venues or programs would not have to be created; an interpretive program could simply be integrated into existing educational and interpretive settings. Finally, innovative research completed in recent years provides not only additional context and content for interpretation, but also established pathways for experimentation, should historic sites wish to carry the effort beyond interpretation into operational change. However, it is critical to note that these interpretive environments do not have to be immersive. It is not necessary that historic ventilation or cooling systems to be wholly operational or to have complete integrity to support interpretive efforts.

Chapter 4: Interpretation Against Invisibility

Both popular and scholarly commentators assert that air conditioning has not just cooled our rooms but reshaped our lives.[91] However, although many writers note that the advent of air conditioning was a "revolution," they also express surprise or uncertainty about when or how it happened.[92] One of the curators of a major 1999 industry-sponsored exhibit at the National Building Museum exhibit, "Stay Cool! Air Conditioning America," described the exhibit's subject matter as something that is "behind the scenes," and reviews of the exhibit often referred to the technology and its output as "invisible."[93] Along the same lines, sociologist Elizabeth Shove argues that the constructs and expectations of "comfort," many of which were shaped by air conditioning, are now so embedded in our everyday lives that they are imperceptible to us.[94] Historians Gail Cooper and Marsha Ackerman have made significant contributions to the discourse on indoor climate control with their critical analyses of the technological development of air conditioning and the evolving social perceptions associated with its introduction into American life.[95] Historic sites offer an opportunity to bring that discourse into the context of physical experience as well as climatic and geographical specificity.

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[91] Rebecca J. Rosen, "Keepin' It Cool" How the Air Conditioner Made Modern America," *The Atlantic*, 14 July 2011; Raymond Arsenault, "The End of the Long Hot Summer: The Air Conditioner and Southern Culture," *Journal of Southern History* 50 no. 4 (Nov 1984): 597-628.

[92] Raymond Arsenault, "The End of the Long Hot Summer: The Air Conditioner and Southern Culture," *Journal of Southern History* 50 no. 4 (Nov 1984): 599; Alexis C. Madrigal, "Most People Didn't Have A/C Until 1973 and Other Strange Tech Timelines," *The Atlantic*, 27 July 2012

[93] Diane Goldsmith, "Keeping Our Cool, An Exhibit On Air Conditioning Shows How The Often Invisible Technology Has Altered America's Architecture, Changed Its Lifestyle, and Shifted Its Population," *Philadelphia Inquirer*, 27 August 1999.

[94] Elizabeth Shove, *Comfort, Cleanliness and Convenience: The Social Organization of Normality* (Berg Publishers, 2004).

[95] Gail Cooper, *Air-Conditioning America: Engineers and the Controlled Environment, 1900-196*0, (Baltimore: Johns Hopkins University Press, 1998); Marsha E. Ackerman, *Cool Comfort: America's Romance with Air-Conditioning* (Washington: Smithsonian Institution Press, 2002).

WHAT IS INTERPRETATION?

The National Park Service defines interpretation as "the process of providing each visitor an opportunity to personally connect with a place."[96] In other words, the critical factors are people and places, and interpretation represents the dynamic relationship—consciously or unconsciously created—between them. This thesis has been primarily concerned with the potential places for interpretation, although it is clear that a meaningful interpretive program must carefully consider, as Alison Hems notes, the visitors themselves, "who bring with them their own notions of the past, their own values and their own sense of place." For Hems and her colleague John Schofield, the relationship between place, interpretation, and visitor must be human-centric and engage in both "hearing and telling past stories."[97] The frame of reference that visitors bring to a historic site has significant influence on their experience of the site and its perceived meaning. Conversely, preservationists have also seen interpretation programs as operative, having the potential to change visitors' frames of reference for their experiences beyond historic sites.

VISITOR PERCEPTIONS OF CLIMATE CONTROL

Perhaps because preservationists felt equally as pessimistic as Fitch regarding Americans' desire to visit non-air-conditioned historic sites, there has not been a significant effort in the field to characterize visitor perceptions of climate control at historic sites. To address this gap in the literature, Elizabeth Kleinfelder, as part of her graduate work in the University of Pennsylvania historic preservation program, undertook a pilot study of visitor and staff experience of indoor climate at three historic

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[96] National Park Service "Interpretation and Education," http://www.nps.gov/learn/

[97] Alison Hems, "Introduction: Beyond the Graveyard – Extending Audiences, Enhancing Understanding," in *Heritage Interpretation*, eds. Marion Blockley and Alison Hems (London; New York: Routledge, 2006), 1-7.

house museums in Charleston, South Carolina: Drayton Hall, an mid-eighteenth-century rural property with no climate control system; the Aiken-Rhett House Museum, an early nineteenth-century semi-urban property with a heating system but no air conditioning; and the Joseph Manigault House, an early nineteenth-century semi-urban property with a limited single-room air-conditioning system.

Kleinfelder is frank about the limitations of her study—she was able only to make one visit during January, a relatively temperate month in Charleston—but her methodology and results, even if anecdotal, suggest some interesting insights for future research. During a single day at each site, Kleinfelder offered to visitors a formal questionnaire, which in addition to querying general physical comfort level during tours of the museum, asked whether visitors "had prior knowledge of the type of climate control system, or lack thereof, in the house," whether that knowledge "affected their decision to visit the site," and if the lack of climate control "affected the authenticity of the experience in the house" or "was distracting during their time in the house."[98] Although the aggregate results of the survey were inconclusive, visitor responses regarding lack of climate control were not overwhelmingly negative. Of course, much of the character of this response could be attributed to the mild season during which Kleinfelder performed the survey.

Kleinfelder's interviews with site guides and interpreters at these three sites presented more complex perspectives, for employees at the sites could not only reflect on their own repeated experiences of the site over several seasons, but also report on observations of visitor behaviors throughout the year. The collective response of the guides to Kleinfelder's inquires was that the summer heat and humidity in Charleston

[98] Elizabeth Kleinfelder, "The Effects of Climate Control on Visitor Experience in Charleston House Museums," (MSHP thesis, University of Pennsylvania, 2008).

could be disruptive to both their experience and the visitors' experiences. The guides felt that visitors were distracted by the heat in the houses, "because visitors will often ask a question that had just been answered by the guide, try to sit where not permitted, or speak to one another rather than listen to the guide."[99] At the Manigault House, guides noted that it was often difficult to get visitors to leave the single air-conditioned room to start a tour on days where the weather is very warm. At Drayton Hall and the Aiken-Rhett House, visitors even occasionally expressed concern that the houses' materials and collections were not being well maintained specifically because they lacked indoor climate control.[100]

While it is not clear how frequent or significant these reported concerns are relative to other factors influencing visitor perceptions and behaviors, it is important to note that they were recorded at all sites, and that the results likely resonate with managers at other historic sites. As operators of historic sites compete for a relatively small pool of visitors in a financially restricted enterprise, they are critically aware of any factor that may prevent a potential visitor from making the trip to their sites.

INTERPRETATION OF THERMAL EXPERIENCE

Yet at the same time the respondents in Kleinfelder's study noted negative aspects of their sites' climate-control situation, they also remarked on the inherent quality of non-conditioned spaces to elicit curiosity about the past. Kleinfelder notes that, "the lack of climate control … inspires the visitors to think about everyday life in the house and ask questions about how the Draytons lived, such as where they took their meals to be comfortable," and that several guides observed that "comfort level prompted visitors to

[99] Elizabeth Kleinfelder, "The Effects of Climate Control on Visitor Experience in Charleston House Museums," (MSHP thesis, University of Pennsylvania, 2008), 63.
[100] Elizabeth Kleinfelder, "The Effects of Climate Control on Visitor Experience in Charleston House Museums," (MSHP thesis, University of Pennsylvania, 2008), 64.

ask questions about life in the house, such as how the family dressed, if they left during the summer, and how they stayed cool."[101]

The curators of the National Building Museum's air-conditioning exhibit lamented the limitations of their museum setting, noting "It would have been fun to play with the climate, but we had to keep the temperature and humidity steady to preserve the artifacts."[102] In contrast, preservationists at historic sites—particularly those with significant or meaningful thermal environments such as those described by Lisa Heschong—have a clear opportunity to leverage the unique qualities of their indoor environments in historical interpretation. Part of the challenge will be to build a positive descriptive vocabulary to describe such thermal environments and to establish a rigorous methodology for documenting them. Peter Manning, although his purpose was towards design not preservation, offered some useful descriptor pairs through which characteristics of thermal environments could be framed: "drafty – stuffy; dry – humid; convected – radiated; central – local; hot – cold; constant – varied."[103] Similarly, preservationist Jorge Otero-Pailos, in his reconstruction of the olfactory qualities of the Philip Johnson Glass House, explored with expert perfumers a methodology and vocabulary to describe and rebuild an "invisible" yet meaningful part of that particular environment.[104] Although their aims are slightly different (i.e. understanding object deterioration), researchers at the University College London Centre for Sustainable Heritage are investigating new cross-disciplinary approaches to archival materials such as

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[101] Elizabeth Kleinfelder, "The Effects of Climate Control on Visitor Experience in Charleston House Museums," (MSHP thesis, University of Pennsylvania, 2008), 60.
[102] Scott Kim, "Reviews: Air Conditioning America, the National Building Museum, Washington, D.C.," *Discover Magazine* 01 Aug 1999.
[103] Peter Manning, "Environmental Aesthetics: Identifying and achieving desired environmental effects, particularly 'image' and 'atmosphere'" *Building and Environment* 26 no. 4 (1991): 331-340.
[104] Jorge Otero-Pailos, "An Olfactory Reconstruction of Philip Johnson's Glass House," *AA Files* 57 (2008): 40-45.

housekeeping records, diaries, and historical climate data to intellectually reconstruct in articulate detail the historical indoor conditions of certain properties in the United Kingdom.[105]

INTERPRETATION OF CLIMATE AND REGION

Interpretation of indoor conditions also presents the opportunity for historic sites to make connections beyond the building to the community and region, although again, a coherent geographical and climatological context and descriptive vocabulary is needed to establish meaningful interpretative programs at the local level. The relevant publications available to local practitioners, for instance the Secretary of the Interior's Guidelines on Sustainability for Rehabilitating Historic Buildings, often list a number of typical "climate-adapted" features such as porches, awnings, and naturally lit corridors, but the authors are no more specific than this "such as" list.[106] The features are not tied to any particular climate, and some features like thick masonry walls or small window openings that are germane to desert climates are not mentioned. This presents a clear opportunity for preservation practice, for as James Marston Fitch suggested as early as 1961, a primary role for historians in contemporary building culture could be the research and interpretation of proven historic climate-adapted building principles and practices.[107]

Along these lines, local interpretive programs would likely draw significant benefit from a published field guide to climate-adapted architecture derived from extensive survey of existing historic buildings. A comprehensive reference tool such as

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[105] Mary Cassar and Joel Taylor, "A Cross-disciplinary Approach to the Use of Archives as Evidence of Past Indoor Environments in Historic Buildings," *Journal of the Society of Archivists*, 25 no. 2 (2004): 157-172.

[106] Anne E. Grimmer, Jo Ellen Hensley, Liz Petrella, and Audrey T. Tepper, *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings, National Park Service Technical Preservation Services*, 2011.

[107] James Marston Fitch, *Architecture and the Esthetics of Plenty*, New York: Columbia University Press, 1961, 244.

Virginia and Lee McAlester's A Field Guide to American Houses that describes both typical and atypical adaptations to the climate would provide local preservation practitioners with a resource against which to compare local manifestations of different climate strategies. Although some preservation researchers have thoughtfully engaged existing contemporary guides for climate-adaptive design in their study of climate factors in historic design, these contemporary guides tend to use very broad parameters and require the direct involvement of trained historians to parse the intersections of national styles and local adaptations.[108] A resource that extensively documents and presents built examples rather than high-level guidelines would be useful for practitioners in the field.

Such a documentation effort also suggests opportunities to engage new resources or existing resources in new ways. For example, the Historic American Building Survey (HABS) could be mined as a resource for information on built responses to climate, and contemporary designers who draw on traditional climate strategies in their current work could be engaged in the discussion and exploration. Moreover, within the past decade, building scientists have found that thermal comfort is both contextually and culturally dependent and are beginning to broaden the engineering standards for thermal comfort. A connection of their work to this interpretive effort could keep the discourse dynamic.[109]

Of course this is not to suggest that preservation should be determined by climate or a building's ability to perform well in its climate, but rather to propose that preservation at the very least should clearly understand the calculus of such forces. For a

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[108] Anat Geva has used the climate guidelines embodied in Norbert Lechner's *Heating, Cooling, Lighting: Design Methods for Architects* (New York: John Wiley and Sons, 1991) in her article "Thermal Comfort in Greek Revival Houses in Texas: A Computerized Energy Simulation," *The Architectural Research Centers Consortium (ARCC) Electronic Journal* (Spring 2002), 56-70. Lechner offers guidelines for only three climate region types: cold, hot-humid, and hot-dry.

[109] Gail S. Brager and Richard J. de Dear, "Historical and Cultural Influences on Comfort Expectations," in *Buildings, Culture and Environment*, ed. Raymond J. Cole and Richard Lorch (Wiley-Blackwell, 2003). Richard J. de Dear and Gail S. Brager, "Thermal comfort in naturally ventilated buildings: revisions to ASHRAE Standard 55," *Energy and Buildings* 34, no. 6, (July 2002): 549-561.

long time, preservation has pursued the visual vocabularies of historical style, cultural meaning, and aesthetics. This is an opportunity to round out that perspective with a clear understanding of the "environmental forces" that shape buildings and that are shaped by them.

A CULTURAL SHIFT

Although it was originally developed to address humidity problems in large-scale industrial settings, air conditioning, once it was integrated into residential and commercial settings, came to be seen as a status symbol, not just a means for conditioning space. A 1960 letter from the University of Texas Buildings and Grounds Committee to the University President regarding priorities for future capital projects expresses this subtle shift,

> It becomes increasingly apparent that air conditioning for most buildings on the campus is a high-priority matter…If we had no air conditioning anywhere, the demand might be less urgent; now, however, the 'uncooled' know about the 'cooled,' and both agree that efficiency is vastly improved by temperature control.[110]

Discussion at a recent sustainability symposium revealed a similar perspective. Non-profit developers of an affordable housing subdivision specifically included air conditioning in the new residences to counteract the stereotypes of affordable housing grown out of decades of substandard (i.e. 'uncooled') developments.[111]

Such cultural considerations also shape preferences about historic models for climate-adapted architecture. A design proposal to provide affordable infill housing in a

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[110] Excerpt from "Material Supporting the Agenda for the Meeting of the Buildings and Grounds Committee, September 16-17, 1960." University of Texas President's Office Records, 1907-1968, Box VF 32/B.b, Folder "Development of the University – Master Plan," Dolph Briscoe Center for American History.

[111] "Low Impact Subdivisions," panel discussion at the Sustainable Urban Design Conference, hosted by McCombs School of Business, Center for Sustainable Development, and Urban Land Institute (University of Texas, Austin, TX, November 18, 2011).

historically African-American neighborhood in the form of climate-adapted vernacular models from regions with a similar climate were roundly rejected by the neighborhood residents because the vernacular forms were reminiscent of times when the residents were economically and socially marginalized. The residents much preferred a design that represented their current social status, namely an air-conditioned ranch home of the late 20th century.[112]

The big question is: in the face of rising energy costs and shifting world climate conditions, can or should Americans change their indoor conditioning habits? This thesis proposes that with active interpretation at historic non-conditioned spaces, it is possible that Americans may come to know, value, and use historic spaces for the very reason that they are not air-conditioned, and that the experience may alter the frame through which they perceive "modern" conditioned space as well. Here, reflection on recent shifts in contemporary food production may be instructive. What was once celebrated for its mechanized and rationalized approach (e.g. canned foods or the "perfect" banana) is now conceived with local and seasonal ingredients, despite occasional inconvenience. Historic buildings and sites, with meaningful interpretation, could play a significant role sparking a similar cultural shift in American conditioning habits.

[112] Marilys R. Nepomeche, "Unacceptable Echoes: Sounding the depths of contextual response in subsidized affordable infill housing," *Places* 11 no. 1 (1997): 28-37.

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