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"The Architecture of Winter"

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The Architecture of

WINTER

Building Against the Season

By Matthew Bronski, Assoc. AIA

“...it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair...” So wrote Charles Dickens in 1859, in what has become one of the best-known opening sentences in all of English literature. The connection of winter to darkness and despair persists throughout centuries of literature and the arts.

Over the last half century, and most acutely in the last two decades, architecture has endured its own season of darkness: the loss of a collective understanding of what it means to design in response to our climate, rather than in spite of it. Mesmerized by the promise of technology, architects have abandoned centuries-old principles. In doing so, they have turned their backs on a robust design sensibility that has evolved across cultures and regions in order to address not only the physical challenges of the winter season, but also its spiritual and emotional challenges.

Antidotes for the Spirit

Across many cultures and periods, light and color are used as an emotional antidote to the season of darkness. The onion shape of the domes of Russian Orthodox churches, for example, though derived from Byzantine architecture, addresses both pragmatic needs and emotional challenges of the harsh winter climate. The onion-shaped domes shed snow clear of

the underlying walls, while the lower curve of the domes, often brightly painted or gilded, reflects and makes manifest the low sun during the short winter days.

Color has played an important role in responses to winter across Northern Europe. Many traditional timber buildings in Scandinavia and Bohemia include exuberantly painted and decorated interiors to brighten the long winter months spent largely inside. Similar approaches have been used on Scandinavian exteriors. As the historian Riitta Nikula relates, Finnish wooden buildings were generally either left unpainted or painted red (to imitate brick) through the 18th century. In 1803, however, King Gustavus IV Adolphus sent a letter to some towns urging the inhabitants to paint their houses yellow rather than red, as yellow was the most appropriate and happiest color.

Taking the opposite tack is the work of modern master Alvar Aalto and his first wife, Aino, on their own house in Helsinki (1935–1936). Aalto’s composition of white-and-brown vertical boards and white-painted brick reminds us of the stark beauty of the winter landscape — as others have noted, the house embodies the silence and austerity of a Finnish birch forest in the snow. In 1936, the identity and spirit of the young nation (Finland gained independence in 1917) were deeply rooted in its landscape. The Aalto House, like the orchestral works of composer Jean Sibelius, embodies this landscape and resonates in a profound way with the Finnish spirit.

Howard House, Nova Scotia, 1995–1999. MacKay-Lyons Sweetapple Architects.



Chalets, Switzerland



Stave church, Norway

The Pragmatic Lessons

Northern European vernacular buildings offer simple but enduring technical and pragmatic lessons for winter design. Scandinavian log construction — whether oriented vertically, as in Norwegian stave churches, or stacked horizontally, as in Norwegian and Finnish farm storehouse buildings and lofts —

In early- to- mid-18th-century America, Southern houses typically had fireplaces located on end walls to throw the heat to the exterior during hot summers, while New England houses had a massive central chimney to retain as much heat as possible. The hearth was not only the physical, but also the symbolic and social center of the 18th-century New England house. Architectural

Northern European vernacular buildings offer simple but enduring technical and pragmatic lessons for winter design.

takes advantage of a locally abundant material that provides good insulation. Deep overhangs at roofs (and overhanging upper stories on lofts) shelter walls from snow and leakage. Entrances located on gable ends avoid the hazards of ice and snow sliding off roofs. In Scandinavian examples, as well as in Russian wood churches, raised, covered entrances protect doors from being blocked by snowdrifts. Some early Scandinavian farm buildings in areas of relatively less severe snowfall have low-slope roofs that add insulation by accumulating snow in the winter. More commonly, in areas of heavier snowfall, steeply sloped roofs shed snow and prevent structural collapse.

American vernacular buildings include some similar responses but use the materials and technology of their own place and time. In the latter 19th century, manufactured metal roofing became widely available and affordable. It became the roofing of choice on vernacular buildings in the Adirondacks and other northern snow-bound regions, as the slickness of the metal encourages snow slide-off to prevent structural failure. The most successful vernacular designs in the Adirondacks include steeply sloped metal roofs, without valleys or dormers, to most effectively shed snow.

The Symbolic Fire

In some cases, pragmatic and symbolic responses to winter are intertwined in the American vernacular.

observation of the social importance of the fire was far from new, even in the 18th century. Over 1,500 years earlier, Vitruvius had written that it was fire that originally brought man together for social interaction.

Integrating the Lessons

Although the fireplace was no longer the source of heat by the early 20th century, Frank Lloyd Wright understood the role of the hearth in social interaction. Referring to his Usonian houses (his attempt to create affordable, well-designed, truly American dwellings), Wright wrote that we could “never make the living room big enough, the fireplace important enough.” In many Usonians, his interior color palette of warm red, orange, or golden tones further emphasized the symbolic warmth of the hearth.

Part of a subset of late 19th- and early 20th-century architects who were influenced and inspired by the vernacular, Wright is a pre-eminent example of an architect who clearly understood the importance of designing for winter. He learned the vernacular lessons, took advantage of traditional materials where they made sense but embraced new technology where appropriate, and integrated these lessons to execute highly original works in his own vocabulary.

Wright’s responses to winter ranged from the symbolic and emotional to the technical and pragmatic. He wrote that snow was the best insulation, and designed low-slope roofs that retain



Aalto House, Helsinki, 1935–1936. Alvar and Aino Aalto.



Zimmerman House (before recent renovation), Manchester, New Hampshire, 1950. Frank Lloyd Wright.

the snow, with immense roof overhangs that shelter the walls. Incorporating appropriate technology, his radiant floor heating schemes provided better heat distribution and human comfort than more commonly used radiators or air ducts. And consideration of the winter climate often helped shape the overall form of

architecture seems to be suffering from a collective amnesia for even some of the simplest lessons.

At an international building-durability conference last year in Europe, a Finnish researcher described an epidemic of wood-wall leakage and deterioration problems in Finland as recent

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Wright's houses. Many of Wright's Northern houses, like the Zimmerman House in Manchester, New Hampshire, rebuffed the north wind with a mostly solid wall, and opened to the south with large expanses of glass and a deep roof overhang to shade the glazing in summer, while allowing the low winter sun to warm the interior masonry.

Wright's second house for the Jacobs family in Wisconsin, a "solar hemicycle" (so called because of its C-shaped plan), mounds an earthen berm against a solid masonry wall to the north, with a curved glass wall to the south to capture the low winter sun. Wright's use of the berm to stabilize seasonal temperatures had much precedent. For centuries, burrowing into the earth has been a way to mitigate extreme temperatures at many latitudes, as Thoreau reminded us in *Walden* when he described digging his root cellar into the south slope of a hill. (The many forms of earth-sheltered dwellings in China support Thoreau's contention.) While Wright's buildings clearly have their share of technical problems (roof overhangs that sag and leak, radiant floor heating pipes that rust and destroy their concrete floors), these problems are easily solved in new design, and Wright's broader lessons of designing for winter are still relevant today.

The Winter of Despair

Sadly, the accumulated lessons of Wright and the vernacular in designing for winter are frequently forgotten. The profession of

residential designs have forgotten the simple vernacular wisdom that sloped roofs should overhang walls. Too often today, architects conceive buildings with little regard for their winter climate, instead expecting that better materials and technology (such as membranes, air barriers, sealants, insulation, and insulating glass) make any design and building form viable. In cold climates, immense skylights in a high-humidity environment (like a museum or natatorium) are a potentially problematic proposition, but they seem to be the rule rather than the exception in recent new designs. Too many designers assume that an expensive skylight and insulating glass are all that are needed to prevent condensation and related problems — and too often they are wrong. Today's improved materials and construction technology should be used to support and enhance a fundamentally sound design, rather than to attempt to compensate for a fundamentally problematic one.

The overall forms of many prominent new buildings seem conceived in spite of winter, rather than in concert with it. The glass box continues to appear frequently in Northern climates, often justified on the grounds of being "aesthetically contemporary" (although it is difficult to believe that claim more than a half century after the Farnsworth House and the Lever House). As a building form, the colossal bridge at Harvard's One Western Avenue is the antithesis of Wright's hemicycle: Rather than using the building's form to naturally mitigate winter cold,



Agnew House, Nova Scotia, 1996–1998.
MacKay-Lyons Sweetapple Architects.

the bridge form dictates that no surface will be tempered by the warmer ground; moreover, the underside of the bridge will lose heat to the colder winter air. Technology (air barriers, insulation, and heating systems) will need to compensate. Sert's Peabody Terrace, directly across the river, offered a beautiful lesson and a far more logical response for a large dormitory on the Charles River. While a few buildings are turned to create well-proportioned and humanly scaled outdoor spaces, most of Sert's buildings present a concrete wall to the north, with large areas of glazing to the east and west. The mostly glazed walls to the west offer river views, and are warmed by the winter sun, yet shielded from excessive summer heat gain by balconies and louvers.

The Spring of Hope

Hope is not lost. Some contemporary architects are designing for winter in thoughtful ways that do not ignore centuries of accumulated wisdom and experience, but integrate and express these lessons in buildings that are of their own place and time, and that have their own authenticity.

E-House, Michael McDonough's much-publicized, environmentally progressive house project in the Hudson River Valley, is a recent example. Although the house relies very heavily on computer technology — perhaps too heavily — it also recognizes and incorporates time-proven, low-tech responses to winter. The overall form

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and orientation of the house are partly shaped by the climate and the sun. The fireplace design is based on a traditional Rumford radiant firebox, and anchors the great room as a social gathering place. A bread oven adds emotional comfort, and a bit of heat, in winter. The house includes radiant floor heating, a classic Wright solution in cold climates. While the appearance of the house isn't the least bit Wrightian, McDonough was so influenced by his responses to winter that he declared Wright the patron saint of e-House.

MacKay-Lyons Sweetapple Architects, based in Halifax, Nova Scotia, has designed a series of contemporary houses and cottages along the Nova Scotia coast that are richer because they are informed and shaped by their harsh climate. The Agnew House — on a cove on the Atlantic coast — has a steeply sloped roof with massive overhangs. The house employs the time-tested vernacular precedent, but reinterprets it, using the massive roof overhang and perpendicular supporting walls to define outdoor space. The Danielson Cottage, designed for a meteorologist and a landscape architect, sits isolated on the edge of a cliff on the tip of Cape Breton Island. On precious, warm, clear days, the cottage walls open to the outside, affording views to Newfoundland. A gleaming metal roof wraps over the top of the house and down two walls, like a fisherman's rain hat with the ear flaps turned down — a reminder that storms can roll in quickly and unexpectedly even on the sunniest days. During inclement weather, the house closes in upon itself, battens down the hatches, and waits

for the storms to pass. The architects' consideration of climate and place has enriched, rather than hindered, the overall form, originality, and authenticity of their buildings.

For many others who fail to adequately consider winter climate in their design, it is all too easy to fall into the construction technology trap. The more we conceive buildings with little regard for their climate, and the more heavily we rely on construction technology to overcome inherent incompatibilities between the building's design and its climate, the more finicky and prone to failure our building envelopes become. The frequent lack of adequate consideration of climate marks the "winter of despair" in current design. This disconnect from place-based, climate-based design merits widespread rethinking, particularly as we now face the "period of consequences" of the global climate crisis. But, as Percy Shelley asked, "If Winter comes, can Spring be far behind?" Hope is on the horizon; the interest of a few in learning the lessons of the vernacular, and the laudable interest of many in green buildings and sustainability, may renew more widespread emphasis across the architectural profession on buildings that better suit their respective climates. As that happens, a new architecture of winter will emerge, and the built and natural environments and the architectural profession will all be the better for it. ■

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